This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

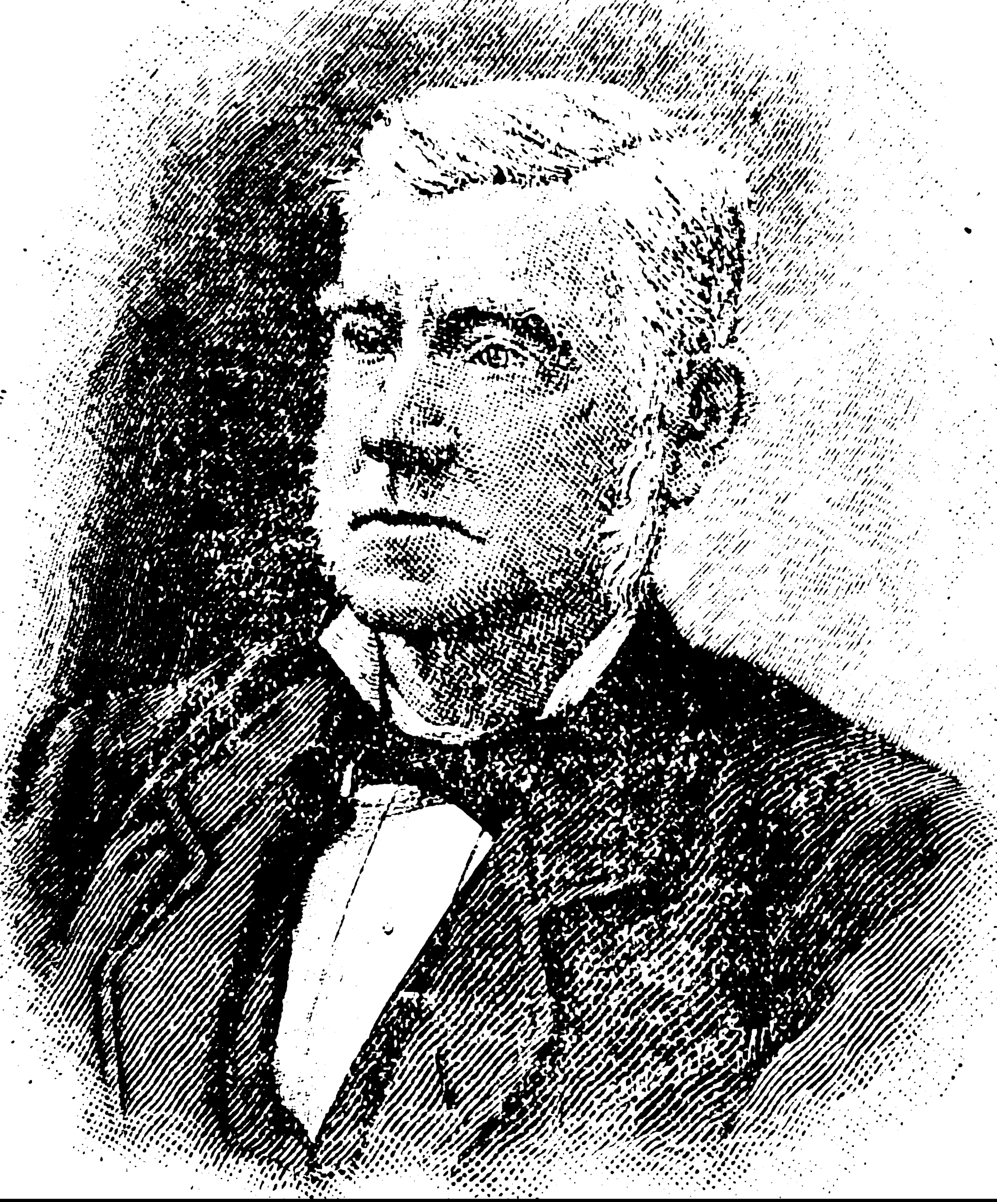
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

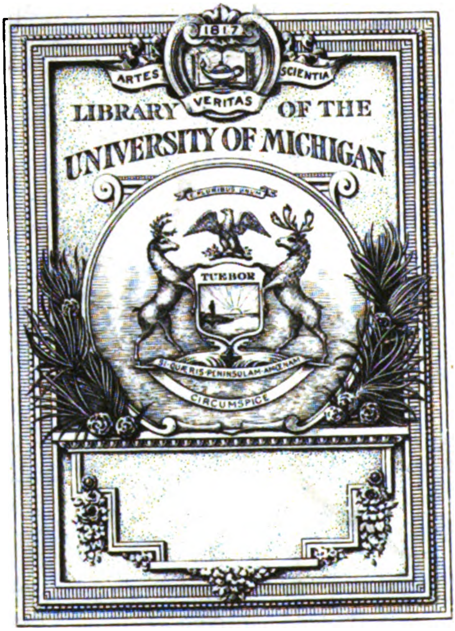
About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`



A Handbook of Agriculture

Wisconsin Farmers' Institutes



LIBRARY OF THE
UNIVERSITY OF MICHIGAN

Wisconsin Farmers' Institutes

1888.

BULLETIN NO. 2.

EDITED BY

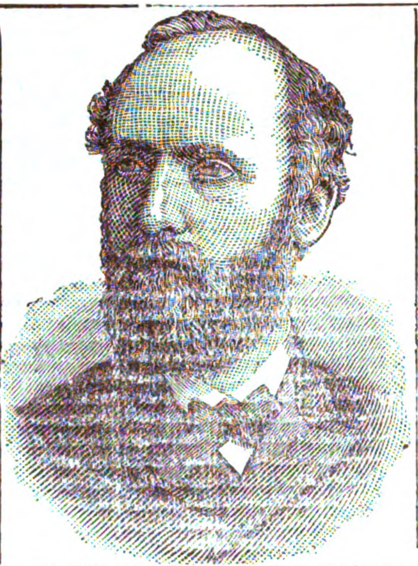
From

W. H. MORRISON,

Superintendent.

MORGAN

THE
DRY
GOODS
MAN



THE
DRY
GOODS
MAN

OF MILWAUKEE

has now on hand one of the finest stocks of choice though cheap

Fall Goods

ever seen in the Northwest. Among the many may be mentioned

ckets, **Wraps,** **Raglans,** **Shawls,**
Dress Goods, **Silks,** **Velvets,** **Plushes,**

Millinery, Underwear, Hosiery, Blankets and Comfortables, Shoes, and the thousand-and-one other things which go to make up the stock of a high-class dry goods house. All are being sold at those close-trimmed prices which have characterized "Morgan's" for upwards of fourteen years.

☞ Mail Orders Solicited. ☜

JAMES MORGAN,
386, 388 and 390 East Water St., (Branch: 1430, 1432 Vliet St., cor. Fifteenth,)
MILWAUKEE, · · · WISCONSIN.

☞ Mention "Farmers' Institute Bulletin" when writing to Advertisers.

S
129
.F3

39084

WISCONSIN

FARMERS' INSTITUTES.

1888.

BULLETIN NO. 2.

EDITED BY

W. H. MORRISON, Superintendent.

MADISON, WISCONSIN.
1888.

WESTERN FARMER CO., . .
. PRINTERS AND PUBLISHERS, .
. . . . MADISON, WIS.

·. neral

TABLE OF CONTENTS.

Horticulture. *Page.*

The Horticulture of Wisconsin, by B. S. Hoxie........ 1
Market Gardening, by J. M. Smith........ 4
Raspberry and Blackberry Culture, by C. H. Hamilton........ 9
The Farmer's Fruit Garden, by Geo. J. Kellogg........ 11
Potato Culture, by Kennedy Scott........ 16
Experience in Potato Raising, by Matt Anderson........ 19
Grain Raising, by Geo. C. Hill........ 23

Educational.

Wisconsin's Agriculture, by F. B. Norton........ 27
Reorganization of the Weather Service, by Pres. T. C. Chamberlin........ 31
Industrial Education, by Pres. W. I. Chamberlain........ 36

Ensilage.

Field Corn Culture, by D. F. Sayre........ 43
Fodder and Ensilage Corn, by John Gould........ 46
Experience with Fodder Corn and the Silo, by Hiram Smith........ 49
Silo and Ensilage Experience, by Chas. R. Beach........ 54
The Best Crop for Ensilage—Its Cost, by Geo. A. Austin........ 58
Three Years' Experience with Silos, by H. S. Weeks........ 60
The Silo in Eau Claire County, by S. E. Coolidge........ 62
Ensilage for Fattening Cattle, by C. V. Guy........ 64
My Experience with Ensilage, by John Urquhart........ 67
Experience in Taylor County, by G. W. Adams........ 68
Experience in Winnebago County, by W. B. Vankirk........ 71
Does the Silo and Ensilage Pay? by J. H. Foster........ 76
Telling Facts in Favor of Ensilage........ 79
Building of Silos, by John Gould........ 80

Cattle.

The Cattle Industry, by J. McLain Smith........ 91
Summer Feeding, by H. C. Thom........ 96
Profits in Beef Production, by A. A. Arnold........ 101
Merits of the Jersey, by T. L. Hacker........ 104
Merits of the Shorthorn, by Geo. Harding........ 105
Merits of the Holstein, by John Urquhart........ 107
Merits of the Jersey, by Geo. E. Bryant........ 110
Merits of Red Polled Cattle, by E. W. Keyes........ 112
Merits of Galloway Cattle, by J. C. Kirkpatrick........ 116
Merits of the Guernseys, by G. E. Gordon........ 118
Raising of Calves, by Prof. J. W. Robertson........ 121

Educational.

Why Adam Left the Farm, by Mrs. V. R. C. Barlow........ 124
Agricultural Education, by Prof. W. A. Henry........ 128
Farm Residues, by Prof. Manly Miles........ 133
Advice and Breed, by Hon. R. G. Horr........ 138
The Farmer's Duty to his School, by C. W. Garfield........ 140
The Apiary, by Mrs. Hills........ 143

Horses.

The Carriage Horse, by A. O. Fox........ 150
Horse Breeding in Wisconsin, by J. M. True........ 154
The Trotting Roadster, by Dr. S. M. Blake........ 159
Breeding Trotting Horses, by Seymour Brooks........ 164
The Conformation of the Horse, by Dr. V. T. Atkinson........ 168

Dairy.

What Cow Does the Dairyman Need? by Hon. W. D. Hoard........ 173
Money Returns for Food Consumed, by C. R. Beach........ 178
Dairying for Profit, by E. G. Fuller........ 182
Equalizing Dairy Production, by Hon. Hiram Smith........ 188
Shall Farmers' Wives Make Butter, by John Gould........ 190
Butter Making on the Farm, by F. C. Curtis........ 193
My Experience in Dairying, by C. P. Goodrich........ 196
Economy on the Dairy Farm, by S. B. Morrison........ 199
Exhibitions and Prize Butter, by Prof. J. W. Robertson........ 203

Educational.

Farmers as Business Men and Citizens, by Hon. H. C. Adams........ 206
Industrial Education for Our Girls, by Mrs. L. B. C. Gault........ 214
To Improve Our Country Social Life, by Mrs. J. A. Clark........ 220
Does It Pay to Think? by Hon. W. D. Hoard........ 227

Sheep and Swine.

Sheep Husbandry, by H. J. Wilkinson........ 230
Experience in Sheep Raising, by W. L. Ames........ 234
The Handling of Sheep, by C. A. Hatch........ 237
Sheep in Wisconsin Agriculture, by Geo. McKerrow........ 241
Status of Sheep Raising To-day, by A. H. Craig........ 245
To Beginners in Sheep Husbandry, by Harrison Cole........ 250
The Coming Hog, by Theodore Louis........ 254
Swine Raising in Wisconsin, by Geo. Wylie........ 260
Plan for a Model Hog House, by L. H. Adams........ 263

INDEX TO ADVERTISEMENTS.

	Page.
Arnold, A. A., Short-horns and Berkshire Pigs	293
Bunde & Upmeyer, Watches and Jewelry	276
Belle City Manufacturing Co., Ensilage Cutters and Hay Tools	280, 281
Briggs, H. A., Percheron Horses	287
Butters & Peters, Salt and Lumber Co	289
Borden, Selleck & Co., Howe Scales	306
Bradford, J. B., Pianos and Organs	329
Boss Harrow Manufacturing Co., Harrows and Pulverizers	332, 333
Chicago, Milwaukee & St. Paul Railway Co	268, 269, 270
Chicago & Northwestern Railway Co	277, 283, 297
Chicago, St. Paul, Minneapolis & Omaha Railway Co	288
Cornish, Curtis & Green, Ensilage Corn and Dairy Supplies	301
Chicago, Burlington & Northern R. R. Co	336
Dunham, M. W., Imported Horses	290
Dickinson, The Albert Co., Seedsmen	323
Ellwood, W. L., Imported Horses	282
Ertel, Geo., & Co., Hay and Straw Presses	305
Fargo, F. B., & Co., Dairy Supplies, Butter Color, Etc	278
Fox, A. O., Carriage Horses and Short-horns	310
Fox, William, Grape Vines and Jerseys	343
Fuller & Johnson Manufacturing Co., Agricultural Machinery	344, 345, 346, and cover.
Green Bay, Winona & St. Paul R. R, Co	304
Gordon, G. E., Guernsey Cattle	314
Galbraith Bros., Imported Horses	320
Hoard's Dairyman	317
Hacker, T. L., & Co., Jersey Cattle	342
Jacobs, W. H., Short-horn Cattle	300
Johnson & Field, Fanning Mills and Rollers	325
Kelly, T. L., & Co., Dry Goods	275
Kingman, R. S., Jersey Cattle	296
Kiser, J. C., Short-horn Cattle	298
Keytone Manufacturing Co., Agricultural Machinery	302, 303
Kniffin, L. G	318
Louisville & Nashville R. R. Co	299
Louis, Theodore, Poland China Pigs	318
Lowe, Victor, Jersey Cattle	334
Landreth, Albert, Seedsman	339
Morgan, James, Dry Goods	cover
Mitchell, Lewis & Co., Wagons	295
Milwaukee & Northern R. R. Co	307
Milwaukee, Lake Shore & Western Railway Co	312
Markham, F. M., Grinding Mill	315
Miller, C. B., & Co., Jersey Cattle	338
Milwaukee Sentinel	341
Northern Pacific Railroad Co	324
Ogilvie, R. B., Clydesdale Horses	328
Pabst, Fred., Percheron Horses	286
Rosenkrans & Thatcher Co., Watches and Jewelry	271
Rich, A. W., & Co., Dry Goods	274
Remington Standard Typewriter	284
Ross, E. M., & Co., Ensilage Cutters	326, 327
Roe, D. H., & Co., Dairy Supplies	273
Stafford, W. K., & Co., Crockery	272
Salzer, John A., Seedsman	279, 287, 296, 311, 319
Spencerian Business College	285
Stowell, O. G.. Tank Heaters and Windmills	291
Smalley Manufacturing Co., Ensilage Cutters	308, 309
Silberzahn, Chas., Ensilage Cutters	313
Steele & Martin, Red Polled Cattle	316
Silver & Deming Manufacturing Co., Ensilage Cutters	330, 331
Sheldon, The S. L. Co., Agricultural Machinery	335
Tratt, F. W., Guernsey Cattle	340
Urquhart, John, Holstein and Jeasey Cattle	321
Wisconsin Central Railroad Co	292
Wegemann, A. H., Holstein Cattle	294
Western Farmer Publishing Co., Books	325
Wylie, George, Poiand China Pigs	322
Valerius, Dr., & Co., Imported Horses	337
Western Farmer	outside cover

LAW PROVIDING FOR AGRICULTURAL INSTITUTES.

The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. Section 1, chapter 9, laws of 1885, is hereby amended, by omitting from said section the words, " in the months of November, December, January, February, March and April in each year," where they occur in the fifth, sixth and seventh lines thereof, so that said section, when so amended, shall read as follows: Section 1. The Board of Regents, of the State University, is hereby authorized to hold institutes for the instruction of citizens of this state in the various branches of agriculture. Such institutes shall be held at such times, and at such places as said board may direct. The said board shall make such rules and regulations as it may deem proper for organizing and conducting such institutes, and may employ an agent or agents to perform such work in connection therewith, as they deem best. The course of instruction at such institutes, shall be so arranged as to present to those in attendance, the results of the most recent investigations in theoretical and practical agriculture.

SECTION 2. Section 2, chapter 9, laws of 1885, is hereby amended, by striking out the words, " five thousand dollars," where they occur in the fourth line of said section, and inserting in lieu thereof the words, " twelve thousand dollars," so that said section, when so amended, shall read as follows: Section 2. For the purposes mentioned in the preceding section, the said board may use such sum as it may deem proper, not exceeding the sum of twelve thousand dollars in any one year, from the general fund, and such amount is hereby annually appropriated for that purpose.

SECTION 3. This act shall take effect and be in force, from and after its passage and publication.

Approved March 16, 1887.

LETTERS OF TRANSMITTAL.

SHEBOYGAN FALLS, Wis., September 11, 1888.

TO HON. GEO. H. PAUL,
President Board of Regents, University of Wisconsin:

I herewith transmit to you for publication Bulletin No. 2, prepared by W. H. Morrison, Superintendent of Wisconsin Farmers' Institutes. This valuable document contains the addresses and discussions at the closing institute held in the

City of Madison, in March last, and is a sample of the eighty-two institutes held during the past year. In every part of the State they were largely attended and warmly welcomed.

Applications for institutes to be held the coming winter have already been received far beyond our ability to accept. It is plainly manifest that there has been a great advance made in agricultural knowledge since the inauguration of farmers' institutes, in this State, and under the able and judicious management of Superintendent Morrison, all branches of agriculture pursued in Wisconsin have had careful attention.

Evidence of the acceptance of the teaching advanced at the institutes the past two years is shown in the fact that over 1,000 silos have already been built, and large additions to the number will follow the present year. The unanimous testimony of the owners is, that they can keep one-third more stock, and in better condition, on the same number of acres. The introduction of corn as a forage crop, during the past two years, has greatly mitigated, if not entirely removed, the losses hitherto sustained during a protracted drouth.

A growing disposition is manifest among farmers to select better live stock and to feed with more intelligence, so as to secure the greatest growth and largest production at smallest cost of labor.

A higher appreciation of the value and importance of increasing the fertility of the soil, and a wiser understanding as to how to accomplish it, are some of the results of the Farmers' Institutes, greatly aided by work at the Experiment Station, and cordially assisted by many of the most intelligent agriculturists throughout the State. These tangible benefits to the great and growing agricultural industries of the State, give hope and courage to those who have been instrumental in contributing to the success already attained, and will be a powerful incentive to renewed efforts in the future.

Respectfully,
HIRAM SMITH,
Chairman Farm Committee.

MADISON, WIS., November 1, 1888.

HON. HIRAM SMITH,
Chairman Farm Committee Board of Regents, University of Wisconsin:

I have the honor to present to you Bulletin No. 2, Wisconsin Farmers' Institutes. The edition issued of Bulletin No. 1, of which there were, 31,000 copies, is nearly exhausted.

The time has come when a farmer, to win success and a competence on the farm, must prepare himself by systematic work. The Farmers' Institute is a traveling school of agriculture, which practically is not only educating the farmers of our State in improved methods, and the practice of advanced and successful farming, but is awakening an interest and pride in our State University, and many of their sons and daughters, catching the fire of this awakening, are availing themselves of its educational advantages.

Respectfully,
W. H. MORRISON,
Superintendent.

PREFACE.

To the Farmers of Wisconsin — During the winter of 1887-8, eighty-one Farmers' Institutes were held in this State. The accompanying report of the closing meeting at Madison, is an epitome of the ideas made specially prominent in this work.

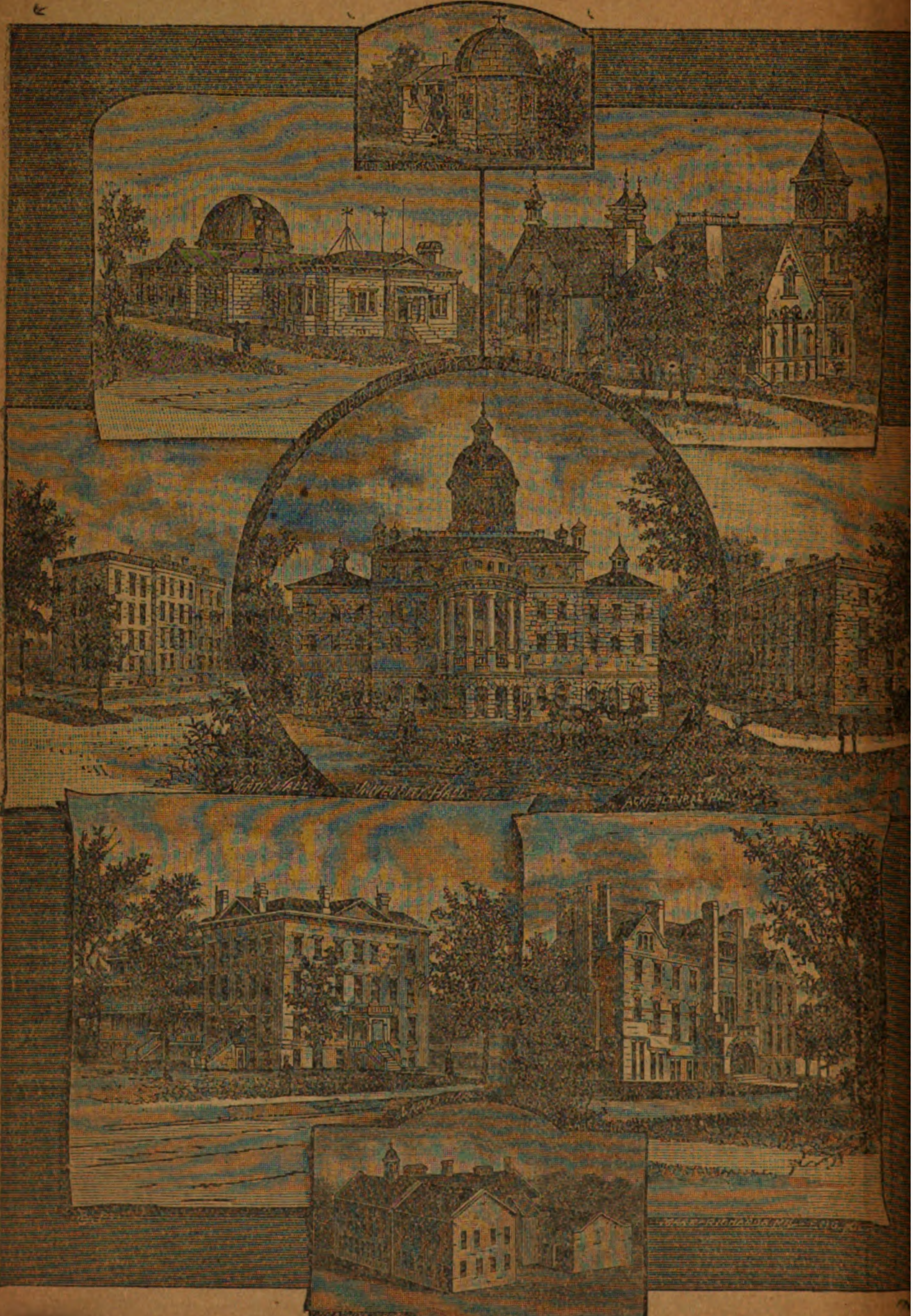
A gratifying feature of last winter's institutes was a more general participation of practical farmers in the discussions. So far as possible, glittering generalities and elocutionary displays were avoided. To inspire and encourage the general farmer, to present the essential truths about farming, and make them clearly understood have been the principal purposes of the institutes.

Organized and carried on to increase the agricultural wealth of the State, they have had a phenomenal success. The money-making and economical methods of the farm have been plainly pictured before tens of thousands. In every neighborhood, and in almost every farm home, these methods and practices have been discussed. They have brought not only material advantages, but mental stimulus; they have had a tendency to not only make workers but thinkers; not only successful farmers, but broad-minded men. Incidentally, they have taught the lessons of good citizenship, duties to children, to neighbors, to other classes, to the State.

The institute work in Wisconsin has obtained a reputation not limited to its own boundaries. I am in receipt of hundreds of letters from every section of the Union asking for the reason of our success. One prime cause, and one apt to be overlooked, has been the fact that the farmers of the State have accepted it with a broad and generous judgment. They have brought into it modesty, practical knowledge, a desire to learn, loyalty to their business, an earnest and charitable spirit of helpfulness toward the institute management. A great work has been done, but the agricultural revolution which is to take place in Wisconsin has only just begun. The knowledge contained in this volume, utilized on every farm in the State, would double the average of every farm product.

The work of the Farmers' Institutes will never be finished until sound judgment and the best knowledge rules every farm, and agriculture ceases to be a progressive art. We ask every farmer who shall read this volume to aid us with his active sympathy and support in making the institutes more effective for good among the farmers of this State.

W. H. MORRISON,
Superintendent.


University Hall
Agricultural Hall

UNIVERSITY OF WISCONSIN.

Advances of the Past Year.

In our last BULLETIN attention was directed to the fact that the University of Wisconsin had grown faster than the people's knowledge of it, and that a true university of the higher order was developing in our midst more rapidly than had been realized. The growth of the past year has given added truth to this since it has been exceptional not only in the increase of students and in the enlargement of the facilities for instruction, but also in the introduction of new and important features.

The increase in the number of students was fully twenty per cent., and these were distributed through the several departments in such a way as to show a well-balanced growth, and not an exaggerated development in some special line.

The completion of Science Hall — probably the finest building of its kind in this country — has added very greatly to the accommodations afforded for scientific work, and, by relieving the crowded condition of other buildings, has benefited nearly all departments. The purchase of large quantities of the very best modern apparatus and the addition of choice collections in the departments of metallurgy, mineralogy, geology, zoology, etc., together with a careful selection of laboratory manuals, of technical and scientific treatises, and of documents adapted to the work of the newly established *seminars*, have greatly increased the facilities for advanced instruction according to the best modern methods.

There have been added to the ten regular courses of study previously offered, three additional ones, namely, a special course in science antecedent to the study of medicine; a civic-historical course — or rather group of courses — antecedent to the study of law and journalism, and a group of special courses for Normal School graduates.

There has been introduced the German *seminar* system of work, which is intended to vitalize and extend the range of study, and to develop the spirit of original investigation in the historical, linguistic, literary, mathematical and other departments. This system has proved its superior efficiency in Germany, and has been introduced in a few of the foremost institutions in this country. It is believed that it will greatly stimulate and broaden the work in the literary departments, very much as laboratory methods and original research have done in the scientific departments.

There have been established eight University fellowships, and a ninth has been endowed by the liberality of the Hon. John Johnston, of Milwaukee. These fellowships are not to be mistaken for the ordinary under-graduate scholarships, as they are liable to be, since this is the first institution in the interior to establish them. They are open only to graduates from the regular courses, and provide for an extension of work at the University for two additional years. They will have the practical effect of elevating the range of the University courses to that extent. It is putting an added story on the intellectual edifice. The work will be of a higher order in kind as well as in subject, and will embrace original independent research.

There has been an enlargement of the facilities for independent and original inquiry in various lines, and this important phase of modern education has been industriously fostered. Notable additions to the equipment for such work have been made in astronomy and bacteriology, but the most important have been in the line of agricultural investigation. The equipment of the Experiment Station has been greatly increased. South Hall, which had been previously occupied in part by the agricultural department, has been wholly assigned to it, and has been, in large part, overhauled and refitted, and now furnishes very commodious apartments for it. The laboratory facilities have been fully doubled. New apparatus and a large invoice of important foreign works have been purchased.

A chair of agricultural physics, the first of its kind in this country, has been established, and work in this important department has been inaugurated. The professor occupying this chair will not only engage in original investigation, but will devote special attention to the development of the educational functions of the department, and will give instruction to agricultural students in the physical principles involved in farming operations.

That the growth of the institution is not tending unduly toward the professions and sciences is shown by the development during the year of courses in four additional languages as well as by the introduction of the *seminar* system and the post-graduate courses above alluded to.

Of like import is the establishment of a chair of experimental and comparative psychology — one of the very few in existence — through which an effort will be made to place the supremely important department of mental science in the foremost rank, and to introduce into this field, which has heretofore been so largely occupied with philosophy and speculation, the solid elements of experimentally determined science.

Some important changes have been made in the previously established courses, giving them greater elasticity and affording facilities for consecutive thoroughgoing study in selected lines. There has also been an enlargement of the number of elective studies, so that it is now possible for a student to modify any of the courses to suit his own mental characteristics and preferences to a very important extent. By taking advantage of elective studies there are really open to students an almost indefinite number of courses.

There has been an extension of the system of degrees corresponding to the extension of the University work, and the instructional force has been strengthened.

Some new regulations have been adopted regarding admission to the University, including a system of special local examinations. The standard of admission to the regular college classes, while not changed nominally, has in reality been raised.

THE PROFESSIONAL COURSES.

THE LONG COURSE IN AGRICULTURE.—For some years past the University has offered an extended course in agricultural science, embracing, also, long courses in the closely related sciences. If the opportunities thus afforded had been embraced and industriously followed up, it would have proved a most wise choice to a score or more of talented young farmers' sons. There is just now, probably, a greater demand for thoroughly educated talent in agricultural science than in any other branch of learning. The rapid development of agricultural experiment stations throughout the country creates an exceptional call for ability and skill in that line, and if a few dozen Wisconsin boys who had the native talent had embraced the opportunity, they might now be putting shekels in their pockets and doing the world good and their State honor, at the same time. This course has been reconstructed during the past year, and is now offered with increased and constantly increasing facilities. How long shall it wait for due appreciation?

THE SHORT COURSE IN AGRICULTURE.—To meet an entirely different educational need, a *Short Course in Agriculture* is offered, designed to give, in the briefest time and at the smallest expense, the most available agricultural information. A special statement respecting the course may be found elsewhere in this bulletin.

POPULAR EDUCATION.— But the University is not content to simply rehearse old agricultural doctrines. Its chief effort is to develop new agricultural science and to disseminate it. This it endeavors to do in the most direct and practical way; first, by careful experiments and exact analyses to determine the precise truth, and secondly, by conveying this directly to the farmers by publications and by Farmers' Institutes, so that the *farmers themselves* are coming into direct relationship to the University. It might be too much to say that they are becoming non-resident students of the University, but it may at least be said that they receive information and instruction directly from it. The work of the Experiment Station is best shown by its fruits, and the most of those who read this will, doubtless, also read its reports and know for themselves. As to the work of the Farmers' Institutes this BULLETIN is a witness. In many respects the Farmers' Institutes constitute the most important educational movement of the past decade. That which is taught in them is practical, stimulating, vitalizing, and is probably productive of more thought, observation, inquiry, experimentation and reflection than an equal amount of instruction in any regular educational institution; and, while the amount is limited, the very large numbers in attendance make the total result very great. An institution which directly reaches 50,000 interested truth-seekers is something phenomenal.

LAW COURSE.— The location of the Law Department gives it exceptional advantages. Provided with rooms in the capitol, it is right in the midst of courts, legislative halls and executive offices, right among law-makers, lawyers and judges. Besides its own library the state law library (20,000 vols.), and the great historical library (116,000 vols.), are immediately at hand. Under these conditions the Law Department has had a rapid growth and is attaining a wide reputation.

THE CIVIL ENGINEERING COURSE.—A full four years' course, embracing practical field-work, is offered and shorter special courses are permitted. The facilities are of the first order and are continually being improved.

THE MECHANICAL ENGINEERING COURSE.—The University endeavors to meet the growing demand for mechanical knowledge and skill of the higher order, both theoretical and practical, by furnishing a full four years' course in mechanical science, embracing extended courses in drawing, shop practice and practical testing. It has been found difficult to enlarge the facilities for shop practice fast enough to meet the demand for this popular element of modern education coming, as it does, from students in all the courses.

THE MINING ENGINEERING AND THE METALLURGY COURSES.—A four years' course is offered in mining engineering and also in metallurgy and assaying. These courses have suffered for want of facilities since the burning of old Science Hall, but the new buildings more than compensate for this, and a growth in these departments commensurate with the recent development of mining interests is anticipated.

THE PHARMACY COURSE.—An excellent course in Pharmacy, embracing practical laboratory work, is presented and is well patronized.

CULTURE COURSES.

THE ANCIENT CLASSICAL COURSE.—This course has demonstrated its merits through the experience of the ages and has so many warm friends and stalwart advocates that it needs no commendation here. It is a course in which Greek, Latin and mathematics form the chief agents of culture.

THE MODERN CLASSICAL COURSE.—In this, German, French and other modern languages are substituted for Greek, and thereby the gates are open to the intellectual treasures stored in the European languages, and the means of intercourse with the great peoples of the Continent afforded.

THE ENGLISH COURSE.—This is a comparatively new course, in which, while foreign and ancient languages are offered, the chief emphasis is laid upon our own tongue, the richness and disciplinary powers of which are often overlooked in our admiration of other great languages.

In all these courses mathematics holds a high place, and considerable attention is given to the various physical sciences. Through the electives offered the ratio of these may be largely increased.

THE GENERAL SCIENCE COURSE.—In this the leading place is taken by the natural sciences, embracing chemistry, natural philosophy, physiology, biology, zoology, botany, astronomy, mineralogy, geology and kindred branches, the value of which needs no advocacy in these days of extraordinary utilization of science. With these are also offered extended courses in higher mathematics and the modern languages, especially German and French.

The foregoing are general culture courses intended to give a broad and liberal education while differing somewhat in their chief tendencies. All afford a wide range of study, rich in knowledge and discipline. The three following courses have been introduced during the past year with a view to adapting this general culture to professional courses in medicine, law, journalism and teaching:

THE PRE-MEDICAL COURSE.—In response to a request from the Wisconsin State Medical Society, the University offers a special course in science adapted to those contemplating the study of medicine and surgery. It embraces long thorough courses in chemistry, physics. anatomy, histology, zoology, botany and kindred branches, which are intended to give a broad and solid foundation for the professional medical course, while at the same time they give a due measure of collegiate culture.

THE PRE-LEGAL AND PRE-JOURNALISTIC COURSES.—For the accommodation of those contemplating the study of law or journalism, extended courses in civil polity, economics and historical science, together with literary and philosophical branches, have been arranged so as to constitute the work of the Junior and Senior years of the collegiate course. Students are thus enabled to profit by an adaptation of their college course to their future work without essential deviation from the general purposes of collegiate training.

SPECIAL COURSES FOR NORMAL SCHOOL GRADUATES.—To afford graduates of the State Normal Schools facilities for extending their studies advantageously, and at the same time to attain a recognized standing leading to a degree, without loss of time or inconvenience arising from the want of adjustment of their previous studies to the standard college courses, special courses have been adopted by the University by which two additional years of successful study will enable graduates from the advanced Normal courses to graduate from the University with a degree.

GENERAL FACILITIES.—The Faculty embraces upwards of fifty instructors. The laboratories are new, extensive and well equipped, embracing the chemical, physical, metallurgical, mineralogical, geological, zoological, botanical, civil and mechanical engineering, agricultural and pharmaceutical laboratories. *Seminars* for advanced study in history, language, literature, mathematics, and other branches are being developed.

The libraries accessible to students embrace that of the University, 16,000 volumes; of the State Historical Society, 123,000 volumes; of the State Law Department, 20,000 volumes; of the City, 9,000 volumes, besides special professional and technical libraries, thus affording very exceptional opportunities for reading and special research.

TERMS OF ADMISSION.

All courses of the University are open to ladies on precisely the same terms as gentlemen.

(1) GENERAL EXAMINATION FOR ALL CANDIDATES FOR THE FRESHMAN CLASS: Orthography, grammar, sentential analysis, arithmetic, algebra through quadratics, plane geometry, civil and physical geography, U. S. history.

(2) FOR THE ANCIENT CLASSICAL COURSE, the above (1), and ancient and English history; Latin grammar and composition, Cæsar (four books), Cicero (six orations), Virgil (six books), Sallust's Conspiracy of Catiline; Greek grammar and composition, Xenophon's Anabasis (three books), Homer's Iliad (two books).

(3) FOR THE MODERN CLASSICAL COURSE, all the above (1) and (2) except Greek, instead of which German grammar and twenty lessons in any standard German reader, and solid geometry are required.

(4) FOR THE ENGLISH COURSE, the general examination required of all (1), and English literature, ancient and English history, botany, physiology, natural philosophy and solid geometry.

(5) FOR THE GENERAL SCIENCE, SPECIAL SCIENCE (pre- medical), LONG AGRICULTURAL and all ENGINEERING COURSES, the general examination required of all (1), and German grammar, twenty lessons in the German reader, botany, physiology, natural philosophy and solid geometry.

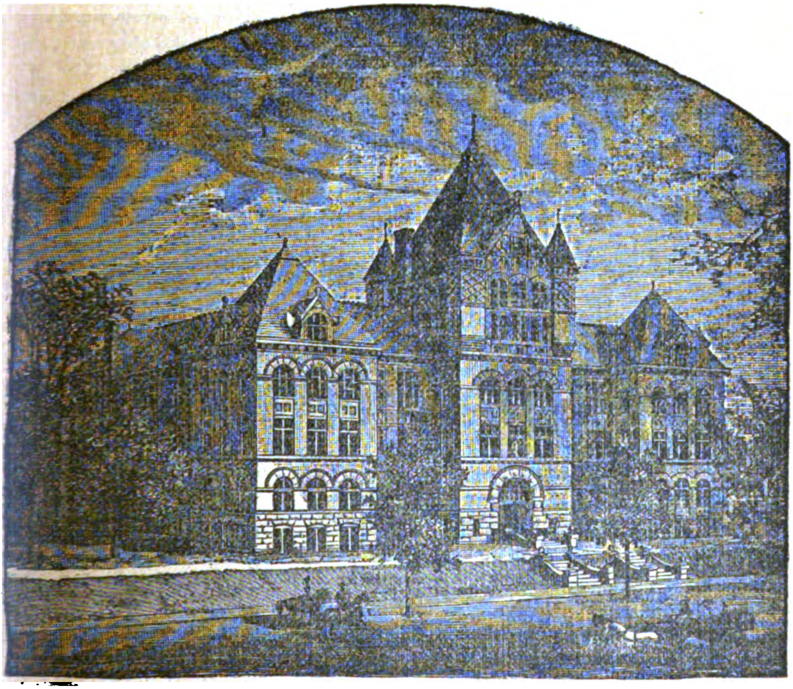
(6) FOR THE CIVIC-HISTORIC COURSE, the same as for the English or classical Courses.

(7) FOR THE ELEMENTARY GREEK CLASS (Greek not required), Latin grammar and composition, Cæsar (four books), Cicero (two orations), Sallust's Conspiracy of Catâline, ancient and English history, and the general examination required of all (1).

(8) FOR SPECIAL STUDENTS, the English branches required for the General Science Course including the general examination (1).

(9) FOR LAW AND PHARMACY, evidence of sufficient education to profitably pursue the courses.

Readers desiring specific details will find the President, Secretary and Registrar ready to give any required information, either of whom may be addressed by title simply.



NEW SCIENCE HALL.

THE SHORT COURSE IN AGRICULTURE.

The University of Wisconsin has provided a special course in Agriculture, to accommodate those young men who desire to gain a better knowledge of the science underlying successful agriculture but who can give only a limited time to such preparation. For the accommodation of such students the term opens January 2, 1889, and lasts twelve weeks.

The facilities now provided to make this an intensely practical and profitable course for young farmers are greatly superior to those offered in previous years.

A reading room and library have been provided in which students will find the standard works on agriculture and files of seventy of the leading agricultural periodicals, nine of which are from Europe. The lecture room will be provided with an electric light so that lantern slides illustrating the lecture may be used.

The famous *Auzoux* life-size model of the horse, which can be dissected to show the separate muscles, nerves, blood vessels and bones, will be used to illustrate the lectures on anatomy.

There will be a laboratory for the use of students in the study of agricultural physics.

Through an increase in the corps of instructors and more ample accommodations than heretofore, it has been found possible to so expand the course as to offer the student work ample for two terms, from which he may elect such subjects as, in his judgment, may seem best for the time, and still have fresh work to which he may return another year should he so desire.

The course embraces the following:

Sixty lectures, mainly devoted to the feeding and breeding of live stock, by Prof. W. A. Henry.

Sixty lectures on the elements of agricultural chemistry, by Dr. S. M. Babcock.

Twenty-four lectures on agricultural botany, together with 108 hours of laboratory work on the common farm plants, by Prof. C. R. Barnes.

A course in shop-practice involving the use of wood-working tools and the forging of iron, by Supt. C. I. King.

Thirty-six lectures on the anatomy of domestic animals, by Dr. V. T. Atkinson, State Veterinarian.

Forty laboratory exercises, during which the student will experimentally demonstrate some of the leading physical principles underlying the cultivation of soil, drainage, stock-raising, farm machinery and questions of sanitation, under Prof. F. H. King.

Twelve lectures on the physical features, climate and meteorology of Wisconsin and of the United States, by Prof. F. H. King.

The expenses of the term need not exceed $65.00 for incidental fees, books, board, room and washing.

This course opens January 2, 1889, and lasts twelve weeks.

No examinations will be required, but applicants must be not less than sixteen years of age and have a common school education.

For farther particulars, address PROF. W. A. HENRY,
Madison, Wis.

STATE INDUSTRIAL ASSOCIATIONS.

OFFICERS FOR THE YEAR 1888.

Wisconsin Experiment Station.

T. C. CHAMBERLIN,	President.
W. A. HENRY,	Director.
S. M. BABCOCK,	Chief Chemist.
F. H. KING,	Physicist.
F. G. SHORT,	Assistant Chemist.
F. W. A. WOLL,	2d Assistant Chemist.
L. H. ADAMS,	Farm Superintendent.
MISS N. M. NOTT,	Clerk and Stenographer.

Office and Laboratories, in Agricultural Hall, University Grounds.
Experiment Farm with buildings joins the college grounds on the west.
Telephone connections.

Wisconsin State Agricultural Society.

President,	John L. Mitchell, Milwaukee.
Secretary,	T. L. Newton, Beaver Dam.

Wisconsin Dairymen's Association.

President,	H. C. Adams, Madison.
Secretary,	D. W. Curtis, Ft. Atkinson.

Wisconsin Shorthorn Breeders' Association.

President,	Geo. Harding, Waukesha.
Secretary,	John M. True, Baraboo.

Wisconsin Jersey Breeders' Association.

President,	N. N. Palmer, Brodhead.
Secretary,	T. L. Hacker, Madison.

Wisconsin State Horticultural Society.

President,	J. M. Smith, Green Bay.
Secretary,	B. S. Hoxie, Evansville.

Wisconsin Swine Breeders' Association.

President,	Geo. Wylie, Leeds.
Secretary,	Geo. McKerrow, Sussex.

Wisconsin Poultry Association.

President, - - - - - - - - - H. L. HUMPHREY, Hudson.
Secretary, - - - - - - - - DR. E. L. BOOTHBY, Hammond.

Wisconsin State Bee-Keepers' Association.

President, - - - - - - - - - - C. A. HATCH, Ithaca.
Secretary, - - - - - - - - - - FRANK WILCOX, Mauston.

Wisconsin Sheep Breeders' and Wool Growers' Association.

President, - - - - - - - - - - W. L. PARKER, Beaver Dam.
Secretary, - - - - - - - - H. J. WILKINSON, Whitewater.

S. E. Wisconsin Sheep Breeders' and Wool Growers' Association.

President, - - - - - - - - - DELBERT UTTER, Caldwell.
Secretary, - - - - - - - . - - A. H. CRAIG, Caldwell.

BREEDERS' DIRECTORY.

An invitation was extended through the press of the State, to all breeders of pure bred stock, to send their name, kind of stock, and post office, to this office for compilation. The following availed themselves of the offer. SUPERINTENDENT.

Percheron Horses.

Astle, George	Prairie du Sac.
Bowles & Hadden	Janesville.
Burrington Bros	Sun Prairie.
Brown, L. & M. A	Delavan.
Brown, Henry	Augusta.
Blackford, J. W	Juda.
Blackman, Henry	Kenosha.
Brereton, T. D	Springfield Corner.
Brereton, Geo. R	Mazomanie.
Coolidge, S. E	Augusta.
Case, H. J	Baraboo.
Crane, W. W	Weyauwega.
Colbeck & Wethen	Darlington.
Chandler & Fox	Oregon.
Coon, H. C	Albion.
Duffy & Pierce	Darlington.
Dohrman, Aug	Mayville.
Ellis, John	Moundville.
Fleming, G. W	Amherst.
Faucette, Thos	Darlington.
Galbraith Bros	Janesville.
Golden, Frank	Cartwright.
Gilman, J. A	Sparta.
Harvey, Charles	Mondovi.
Harvey, James	Mondovi.
Hannar, J. J	Depere.
Holt, D. B	Danville.
Hoover, I. L	Clinton.
Hopewood, E	Merritts Landing.
Hickey, J. E., & Sons	Whitewater.
Hill, H. D., & Son	Lake Geneva.
Holt, C. D	Ranney.
Johnson, Chris	Chetek.
Johnson, David	Jefferson.
Kellogg, Rufus B	Green Bay.
Kay, Andrew	Depere.
Loomer, J. H	Douglas Center.
Lawrence, A. H	Sturgeon Bay.
Lytle, Geo. A	Elkhorn.
McMellen, A	Douglas Center.
Marsh, G. S	Depere.
Murry, John	Fifield.
Morley, N. W	Baraboo.
Morgan, James	Darlington.
McKay, D. G	Chippewa Falls.
Macomber, S. D	New Lisbon.
McWilliams Bros	Oregon.
Mills, Walter	Douglas Center.
Morley, J. W	Ableman.
Myers, H. J	Chetek.
Nihlem Bros	Truesdell.
Odell, J	Bessemer.
Rice, B	Amherst.
Skinner, Thos	Merritts Landing.
Shockley & Andrews	Darlington.
Slaven, John	Reedsburg.
Smith, N. H	Baraboo.
Smith, John M	Eau Claire.
True, John M	Baraboo.
Truax, Peter	Eau Claire.
Turliff, Thos	West Depere.
Wood, James	Fremont.
Wishard, Thos	Depere.
Wiese, Fred	West Depere.
Whelan, J. W	Mondovi.

Clydesdale Horses.

Arries Bros	Augusta.
Briggs, H. A	Elkhorn.
Brown, L. & M. A	Delavan.
Bowles & Hadden	Janesville.
Brown, Henry	Augusta.
Barber, Solon	Augusta.
Brereton, Geo. R	Mazomanie.
Burrington, Bros	Sun Prairie.
Bennett, John	Westfield.
Boyce, Reuben	Brooklyn.
Beattie, Wm	Arlington.
Ellsworth, John M	Dodgeville.
French, H	Galesville.
Galbraith Bros	Janesville.
Hoover, I. L	Clinton.
Hamilton, Hugh	Westfield.
Jones, Robert O	Cambria.
Jones, Richard	Cambria.
Kennedy, Daniel	Galesville.
Lowell, R. D	Sharon.
Lyale, James	Verona.

Clydesdale Horses—Continued.

Miller, William	Rusk.
Norton Bros	Byron.
Ogilvie, R. B	Madison.
Ogilvie, Wm	Verona.
Plenty, John	Poynette.
Perry, Eli	Waupun.
Quick, W. J	Lamartine.
Rhoda, Edson	Centerville.
Richards, Griffith	Cambria.
Russell, Samuel	Westfield.
Root, Philo	Hortonville.
Sprecher, John	Madison.
Stroup, Geo	Lamartine.
Stroup, Uriah	Fond du Lac.
Stocking, John	Eau Claire.
Valerius & Co	Watertown.
White, Chas	Fulton.
Wenzlaff, Chas	Seymour.

Cleveland Bay Horses.

Fox, A. O	Oregon.
Pabst, Fred	Milwaukee.
Urhlein Bros	Milwaukee.
Warren, Geo., & Sons	Fox Lake.
Webster Bros	Danville.

Standard Bred Trotting Horses.

Brooks, Seymour	East Troy.
Blake, Dr	Lodi.
Case, J. I	Racine.
Clark, C. M	Whitewater.
Fox, A. O	Oregon.
Hazen, Chester	Brandon.
Kilbourn, J. M	Lancaster.
McKinney, H. D	Janesville.
Moore, A. C	Fond du Lac.

Shetland Ponies.

Lilburn, Robert	Emerald Grove.

Shorthorn Cattle.

Arnold, A. A	Galesville.
Arries, Robert	Lodi.
Andrus, M. L	Chetek.
Babbitt, Clinton	Beloit.
Bartlett, W. B., & Sons	Eagle Point.
Bickel Bros	Amherst.
Beckler, I. P	Sparta.
Bennett, J. B	Dallas.
Ballentine, James	Bloomington.
Ballentine, David	Bloomington.
Brooks, Seymour	East Troy.
Bryant, Geo. E	Madison.
Brinkerhoff, F	Brandon.
Boyce, Reuben	Brooklyn.
Carver, N. E	Chetek.
Case, H. J	Baraboo.
Campbell, Samuel	Westfield.
Cockeram, Osmond	Menomonie.
Crawford, John	Menomonie.
Cobden, J	Lodi.
Cole, John A	Hustisford.
Collard, Chas	Edmund.
Clark, C. M	Whitewater.
Clark, Isaac	Galesville.
Doane, C. A	Sparta.
Dillon, Thos. H	Mondovi.
Finnegan, P	Stitzer.
Finnegan, P. H	Fennimore.
Farnum, H. J	Prairie du Sac.
Fisher, Seth	Center.
Fitch, F. B	Darlington.
Falkenstein, L	Lodi.
Fish, L. N	Reedsburg.
Forbes, W. H	River Falls.
Golden, Frank	Cartwright.
Green, Myron F	Fulton.
Gough, John	Saukville.
Hartley, Mrs. Mary	La Crosse.
Hubbard, S. D	Mondovi.
Harrington, Dr. C. L	Madison.
Henthorn, Wm	Sylvan.
Hillman, D	Brandon.
Hyatt, A. X	Sheboygan Falls.
Holt, D. B	Danville.
Hopkins, James	Leyden.
Hazen, Chester	Brandon.
Harding, George	Waukesha.
Harden, Wm	Rural.
Hannum, Geo. M	Lancaster.
Jacobs, W. H	Madison.
James, N. L	Richland Center.
Jackson, Allen	Phillips.
Kennedy, Daniel	Galesville.
Kiser, J. C	Oregon.
Kent, W. A	Dallas.
Kay, Robert	Depere.
Lyall, James	Verona.
Lamberton, J. C	Whitehall.
Leiby, John	Greenville.
Lewis, William	Bloomington.
Lewis, Geo. A	Fond du Lac.
Lovering, Albert	Lodi.
Ludlow, A., & Son	Monroe.
Long, Samuel	Westfield.
Mallory, L. D	Westfield.
Mahaffy, James	Montello.
Morley, R. A	Baraboo.
March, John	Shullsburg.
Moss, P. H	Sparta.
McIntosh, C. H	Lodi.
McKibben, J. C	Poynette.
Mathews, John	Darlington.
Mathy, Henry	Depere.

Shorthorn Cattle—Continued.

Mallory, John	Wayside.
Morkin, P	Bloomington.

Norrish, Edward	Rock Falls.
Nathan, Joseph	Lancaster.
Nash, L. M	Centralia.

Ogilvie, R. B	Madison.
Owen, D., & Son	Portage.
Owens, J. E	Brooklyn.

Pound, Thad C	Chippewa Falls.
Porter, John	Whitehall.

Roberts, R. O	Cambria.
Richards, Griffith	Cambria.
Rhodes, Edson	Galesville.
Rezin, Daniel	Rudolph.
Richardson, W. P	Lancaster.
Ross, John, & Son	Mineral Point.
Rewey, J. W	Rewey.

Smith Bros	Rochester.
Stetson Bros	Oshkosh.
Sprecher, John	Madison.
Sherman, H. B	
Scott, Kennedy	Rio.
Scoville, J. M	Lowville.
Scott, Charles	Augusta.
Sanger, C. M., & Son	Waukesha.
Sanderson, Thos	Leeds.
Sanderson, Joseph	Cambria.
Stephenson, Geo	Darlington.
Seymour, S. J	Reedsburg.
Smith, James	Depere.
Stroup, Uriah	Fond du Lac.
Snyder, John	Elkhorn.

Turriff, James	West Depere.
Tormley, Thos	Fennimore.
Tizer, Samuel	Sparta.
Turner, Edward	Amherst.

Van Vonderon, John	Depere.
Van Matre, T. J	Fayette.
Van Matre, Joseph	Mineral Point.

Warren, Geo., & Son	Fox Lake.
Wylie, Geo	Leeds.
Webster Bros	Danville.
Wilson, T	Packwaukee.
Willis, Richard	Lancaster.
Wilson, W. W	Lodi.
Wrinkley, D	Clinton.
White, Alexander	Fulton.

Jersey Cattle.

Adams, H. C	Madison.
Armitage, S. P	Seymour.
Allen, S. S	Darlington.
Allen, J. B., & Son	Delavan.

Bartlett, W. B., & Sons	Eagle Point.
Bradley, W. C	Hudson.
Bradley, C. W	Hudson.
Bryant, Geo. E	Madison.
Button, Thos	Darlington.
Bartley, P	Bloomington.
Briguelette, J. W	Green Bay.
Barrowbridge, Jas	Madison.

Clegg, John	Bloomington.
Convey Thos	Ridgeway.
Cripps, Dell	Independence.
Culberston, H. M	Greenville.
Church, C. & M. H	Walworth.
Cochrane, Thos	Eau Claire.
Coolidge, S. E	Augusta.
Crapp, John	Tomah.
Cuppel, Chas	Milwaukee.

Dettinger, John	Galesville.
Dennerson, Jacob	Augusta.
Dailey, J. G	Hudson.
Doyon, M. R	Madison.
Durand, H. G	Racine.
Driver, James	Darlington.
Dey, John	Hortonville.

Erickson, M. J	Sheboygan Falls.
Ettinger, L. H	Lowell.
Earle, T. H	Darlington.

Fox, William	Baraboo.
Farnum, H. D	Merrimack.
Farnum, L	Stephensville.
Frey, Philip	W. Union Junction.
Farnham, Mr	Shiocton.
Fish, H. Z	Muscoda.

Gay, Wm. M	Madison.
Galloway, E. A	Fond du Lac.
Gibbs, C. R	Whitewater.
Griffith, C. N	Whitewater.
George, F. A	Whitehall.
Grover, P. & E	Amherst.
Greer, M. L	Elroy.

Hacker, T. L	Madison.
Hinkley, A. R	Eagle.
Hinkley, F. D	Mil., 200 Grand Ave.
Harnden, Henry	Madison.
Hitt, D. H	Oakfield.

Jackson, Allen	Phillips.
Jennings, W. H	Tomah.

Kellogg, H. B	Ranney.
Kingman, R. S	Sparta.
King, Edmund	Whitewater.

Lutz Bros	Grand Rapids.
Lawrence, A. W	Sturgeon Bay.
Lytle, Geo. A	Elkhorn.
Lybrand, R. C	Richland Center.
Lilly, Frank	Darlington.
Lowe, Victor	Palmyra.
Lawton, J. G	Depere.

Moon, D. R	Eau Claire.
Muzzy, John	Augusta.
Miller, C. B., & Co	Madison.
Morey, James	Merrimack.
Mole, James	Janesville.
Memger, R	West Depere.
Merrill, H. L	Portage.
Martin, John C	Mineral Point.
Merriman	Ft. Atkinson.
Masse, O. W	Louisville.
Mayo, W. B	Thiensville.
Myers, H. J	Cartwright.

Nuzum, G. W	Viroqua.
Northrap, S. S	Clinton.

Outhouse, Wm. H	Madison.

Palmer, N. N	Brodhead.
Pound, Thad. C	Chippewa Falls.
Pickard, J. W	Richland Center.

Jersey Cattle—Continued.

Pardee, A. J.	Eagle.
Pierce, C. W.	Sheboygan Falls.
Rowe, A. L.	Scandinavia.
Rawson, G. H	Oak Center.
Richardson, A. D	Hudson.
Repine, Samuel	Elk Mound.
Snyder, A. L.	Mt. Hope..
Stewart, Robert	Chetek.
Smith, L. C	Whitewater.
Schreiter	Darlington.
Smith, C. W	East Troy.
Stanley, L. C	Chippewa Falls.
Schermer, F	West Depere.
Sanford, Henry	Manitowoc.
Shanks, W. M	Alloa.
Shultz, L	Rio.
Smith, J. M	Green Bay.
Schroeter, Gustav	Grafton.
Thompson, Paul	Blair.
Tubbs, Peter	Seymour.
Taylor, H. C.	Oxfordville.
True, John M	Baraboo.
Thatcher, Geo	Black Earth.
Urguhart, John	Rio.
Varritey, Mathias	Appleton.
Vivian, Dr. J. H	Mineral Point,
Wilson, T. B	Menomonie.
Wilcox, Sheldon	Depere.
Woodruff, N. A.	Eagle Point.
Walker, Ed	Lancaster.
Wyatt, L. D.	Tomah.
White, N. B	Oconomowoc.
Weeks, N. S	Oconomowoc.

Holstein Cattle.

Allen, Merrick T	Waupaca
Allanson, Geo	Neenah.
Anderson, Louis	Dallas.
Banks, E. J	Chetek.
Baldwin, H. S	Weyauwega.
Barber, F. D	Tomah.
Barker, C. P	Chippewa Falls.
Brown, William	Depere.
Bremner, John	Montello.
Berger Bros	Burlington.
Curtis, I. L	Poynette.
Clark, S. S	Little Rapids.
Cronk, S. W	Louisville.
Carrier, T.	Boscobel.
Chickering, I. B	Rusk.
Clemer, Geo	Lodi.
Chaplin, William	Plymouth.
Chapin, Geo. P	Lodi.
Cheever, D. G	Clinton.
Cochrane, Thomas	Eau Claire.
Dimond, Neal	Montello.
De Land, A. D.	Sheboygan Falls.
Gwinnell, J. B	Lodi.
ans, S. W., & Son	Danville.
Frost, E. D.	Almond.
Farrish, John	Grand Rapids.
Fuller, Bradley	Dallas.
Graves, J. W.	Hudson.
Glover, J. E.	Hudson.
Glock, T.	Weyauwega.
Green, R. P.	Fennimore.
Gillett, T. K	Rosendale.
Grover, W. S	Dallas.
Grant, N. S	Wrighstown.
Hahn, M	Sturgeon Bay.
Hickey, J. E., & Sons	Whitewater.
Hansen, M. R	Hansen.
Hyatt, A. X	Sheboygan Falls.
Hutchinson, W. B	Seymour.
Haily, D	Depere.
Hamcar, J. J.	Depere.
Hanson, P	Ft. Howard.
Harris, Dr. C. C	Dousman.
Holden, C. E	Hudson.
Johnson, Chris	Chetek.
Kurtz, John	Saukville.
Kibourn, J. M	Lancaster.
Lueps, W. G	Manitowoc.
Lybrand, R. C	Richland Center.
Leonard, L. B	Lake Mills.
Lynch, Anthony	New Richmond.
Lutz Bros	Grand Rapids.
Mosher, J. R	Racine.
Meyer, Peter	Appleton.
Mulroy, P	Hortonville.
Morse, L. C	Sparta.
Moon, D. R	Eau Claire.
Mills, Mrs. L. P	Hortonville.
Myers, John	Appleton.
Moore, H. C	Fond du Lac.
Meyers, A., & Son	Beloit.
Maxon, F. W., Estate	Walworth.
Norton, Joseph	Depere.
Pelton, H	Dallas.
Rush Bros	North Greenfield.
Rector, F. E	Fennimore.
Richmond, James	Lodi.
Rowe, A. L	Scandinavia.
Smith, John M	Eau Claire.
Scott, Walter	Hudson.
Scott, M. J.	Bloomington.
Schroeder, F. W., & Son	West Bend.
Selle, Albert	Theinsville.
Sezberlich, Lorenzo	Saukville.
Schneider, Wm	Morrison.
Strang & Wells	Auroraville.
Thompson, G. W	Amherst.
Thomas, J. M	Dixon.
Trigg, J. E	Downing.
Urquehart, John	Rio.
Vinnett, Brono	Eagle Point.
Weaver, M. G	Clinton.
Wegemann, A. H	Lake Mills.
Winton, T. S	Prospect.
White, D. M	Hudson.
Wintermute, Frank	Whitewater.
Ziegler, Fred	Apple Creek.

Guernsey Cattle.

Clapp, I. J	Kenosha.
Fairbank, N. K	Lake Geneva.
Foote, M. H	Spring Prairie.
Foster, H. T	Sparta.
Gerald, Geo	Weyauwega.
Gordon, G. E	Koshkonong.
Hackett, John, & Son	Augusta.
Hoard, W. D	Ft. Atkinson.
Houston, R. S	Kenosha.
Hill, Geo. C., & Son	Rosendale.
Herron, William	Springville.
Hamilton, W I	Fond du Lac.
Kent, Wm	Rusk.
Nichols, Wm	Trempealeau.
Remington, O. T	Amy.
Sedgwick, G. G	Manitowoc.
Schmidt, Nicholas	Greenleaf.
Tratt, F. W	Whitewater.

Devon Cattle.

Baker, Geo., & Son	Hustisford.
Carswell, F. E	Dixon.
Curtis, E. E	Berlin.
Eunis, Wm	Palmyra.
French, H	Galesville.
Groenveld, H	Sheboygan Falls.
Hirschinger, Chas	Baraboo.
Morse, J. W., & Son	Verona.
Northrop, J. D	Clinton.
Rawson, E. L	Oak Creek.
Root, Philo	Hortonville.
Smith, John W	Sparta.
Strong, John	Elkhorn.
Van Vonderen, Jno	De Pere.

Hereford Cattle.

Anandale Live Stock Co	Ripon.
Berkitt, W. W	Darlington.
Edwards, John, & Son	Fisk.
Foshay, Wm	Patch Grove.
Hicklin, James	Patch Grove.
Kevlin, John	Rutland.
Smith Bros	Lancaster.
Sellers, J. W	Viola.
Thompson, Geo. F	Oshkosh.
Van Matre, N. K	Mineral Point.
Williams, J. J	Berlin.
Yumgman, J. J	Sparta.

Polled Angus Cattle.

Barber, Solan	Augusta.
Borah, J. N	Lancaster.
Davy, Peter	Alderney.
Edgerton, S. R	Spring Prairie.
Forbes, W. H	River Falls.
Hoover, I. L	Clinton.
Hughes, J. M	Menomonie.
Hayes, John J	Viroqua.
Kirkpatrick, J. C	Rewey.
Leslie & Burwell	Cottage Grove.
Lilburn, Robert	Emerald Grove.
Ryan, John	Bloomington.
Stone & McConnell Bros	Ripon or Fisk.
Tainter, A	Menomonie.
Torzer, Ole	Liberty Pole.
Van Valkenburg, Mr	Chetek.

Red Polled Cattle.

Brann, Robert W	Merton.
Dutten, Arthur	Centerville.
Daniels, Newell	Hancock.
Hoover, I. L	Clinton.
Jomer, S. H. & A. E	Janesville.
James, N. L	Richland Center.
Keyes, E. W	Madison.
Livermore, Foster	Augusta.
Martin Bros	Gotham.
Steele, William	Merton.
Stone & McConnell Bros	Ripon.

Ayershire Cattle.

Converse, A. D	Whitewater.
Hazen, Chester,	Brandon.
Uecke, John	Seymour.
Preston, S. D	West Depere
Stilson, O	Rochester.

Holderness Cattle.

Works, O.	Augusta.

Poland China Swine.

Armitage, S. P.	Seymour.
Ashton, Robert	Arcadia.
Bradley, W. C.	Hudson.
Buswell, S. N.	Amherst.
Baker, Geo., & Son	Hustisford.
Bonham, J. C.	Bloomington.
Bartlett, W. B., & Sons	Eagle Point.
Ballheim, Mr	South Osborn.
Beardsley, B	Bloomington.
Carpenter, Nathan	Medina.
Convey, Thomas	Ridgeway.
Cole, John A.	Hustisford.
Cavil, Thomas	West Depere.
Carey, John	Bloomington.
Chreslaw, J. M	Dane.
Carver, N. E.	Chetek.
Chappel, D. D	Galesville.
Coolidge, S. E	Augusta.
Day, Charles	Hudson.
Dyer, W. J	Lancaster.
Dey, John	Hortonville.
Davenport, C. A	Auroraville.
Dickson, Thos	Waueka.
Drowtzky, B.	Tomah.
Edwards, James	Bloomington.
Felch, J. H	Amherst.
Fowler, B. T.	Whitewater.
Fitch, F. B	Darlington.
Fish, L. N	Reedsburg.
Getts & Everson	Whitehall.
Gordon, Joseph	Mineral Point.
Green, Myron F	Fulton.
Grisim, G. C	Prairie du Sac.
Hamilton, W. I	Fond du Lac.
Hackett, John, & Son	Augusta.
Huntington, A. W	Baraboo.
Held, Paul	Prairie du Sac.
Hillman, D	Brandon.
Hickey, J. E., & Sons	Whitewater.
Hurley, James	Saukville.
Jackson, John	Mineral Point.
Lawrence, Charles	Danville.
Lytle, Geo. A	Elkhorn.
Louis, Theodore	Louisville.
McGilvra, A. D	Baraboo.
Morley, R. A	Baraboo.
Morrison, A. H	Morrisonville.
March, John	Shullsburg
McIntosh, C. H	Lodi.
Mathews, Geo. G	Burlington.
Mulroy, P.	Hortonville.
Marten, William	Darlington.
Parsons, Geo	Tomah.
Richardson, W. P	Lancaster.
Roberts, R. E	Ives Grove.
Root, William	Hortonville.
Schuerman, G. H	Richland Center.
Schnell, Louie	Tomah.
Steele, S. D	Lodi.
Scott, Kennedy	Rio.
Saunderson, Thos	Leeds.
Saunderson, Joseph	Cambria.
Schmidt, John	Hortonville.
Tubbs, Peter	Seymour.
Talcott, A.	Caldwell.
Taylor, A. M	Bloomington.
Treloar, J. J., & Son	Lancaster.
True, John M	Baraboo.
Urguehart, John	Rio.
Walker, Geo. A	Lancaster.
Willis, R. C	Lancaster.
Waite, E, & Son	La Grange.
Wilcox, J. R	River Falls.
Wylie, Geo	Leeds.
Works, O.	Augusta.

Chester White Swine.

Austin, C. R.	Sparta.
Borland, John	Rusk.
Dey, John	Hortonville.
Evans, S. W., & Sons	Danville.
Holt, D. B.	Danville.
Harlow, O. T	Whitehall.
Joiner, S. H., & A. E	Janesville.
Mooney, J. E	Tomah.
Palmer & Noblet	Springfield.
Roberts, M. W	Belle Fountain.
Smith, J. W	Sparta.
Shroder, F. W., & Son	West Bend.
Stever, J. B	Louisville.
Thompson, S.	Darlington.
Tschudy, Fred	Monroe.
Wheeler, E. D	Lima.
Wyatt, L. D	Tomah.

Berkshire Swine.

Arnold, A. A	Galesville.
Brinkerhoff, F	Brandon.
Brabazon, J. R	Delavan.
Freeman, H	Whitehall.
Metcalf, E. K	Bloomington.
Owens, J. E	Brooklyn.
Peterson, O. E	Amherst.
Smith Bros	Lancaster.
Shurman, G. U	Richland Center.
Wyatt, L. D	Tomah.

Victoria Swine.

Curtis, J. L	Poynette.
Nash, L. M	Centralia.
Park Bros	Caldwell.
Scoville, J. M	Lowville.
Smith, S. B	Caldwell.
Schroeder, G	Grafton.

Essex Swine.

Arlt, Adolph	Seymour.
Brooks, Seymour	East Troy.
Hartley, Mrs. Mary	La Crosse.
Necke, John	Seymour.

Suffolk Swine.

Cass, J. D	Beloit.
Foster, Asa	Elkhorn.
Hughes, J. M	Menomonie.
Joiner, S. H. and A. E	Janesville.

Spanish Merino Sheep.

Andrews, F. S	Mukwonago.
Armitage, S. P	Seymour.
Abrams, L	Bloomington.
Baker, Geo., & Son	Hustisford.
Buttler, E. T	Waterford.
Brooks, Seymour	East Troy.
Brinkerhoff, F	Brandon.
Crawford, J. N	Mukwonago.
Craig, A. H	Caldwell.
Copeland, Chas	Jefferson.
Curren, W. B	Lodi.
Cleland, Chas. S	Janesville.
Clapp, I. J.	Kenosha.
Craig, Perry	Caldwell.
Dixon, J. H	Brandon.
Everets, W. H	Leeds Center.
Fleming, Robert	Wilmot.
Foote, M. H	Spring Prairie.
Fraser & Lobdel	Mukwonago.
Gould, A. F	Lima.
Green, F. H	Leeds Center.
Gale, Isaac	Waukesha.
Holt, D. B.	Danville.
Humbert, Floyd,	Caldwell.
Humbert, Leon	Caldwell.
Holmes, A	Douglas Center.
Jones, Ed	Lima Center.
Jones, D. B	Weiner.
Jones, S. B	Hustisford.
Jones, S. R	Hustisford.
Jones, S. A	Hustisford.
Lewis, Geo. A	Fond du Lac.
Manley, H. H	Hortonville.
McConnell & Bros	Ripon.
McCormick, E	Mt. Hope.
Morley, I. W	Ablemans.
Mill, R. H.	Palmyra.
Parker, Wm. E	Beaver Dam.
Phelps, C. K	Springfield.
Paul, J. H	Genessee.
Porter, Geo. T	Caldwell.
Pitcher, J. H.	Eagle.
Vanderpool, Geo. J	Mukwonago.
Smiley, Wm	Albany.
Sayre Bros	Fulton.
West, Nelson	Fayetteville.
Randolph, N	Troy Center.
Roberts, R. E	Ives Grove.
Rynden, W	Stephensville.
Wilkinson, H. J	Whitewater.

Shropshire Sheep.

Barber, Solon	Augusta.
Forest, W	Poynette.
Fellow Bros	Foscoro.
Glover, J. E.	Hudson.
Kelsey, W. T.	Prairie du Sac.
Lewis, Wm	Bloomington.
McKerrow, Geo	Sussex.
Owens, J. E	Brooklyn.
Payne, J. C	Prairie du Sac.
Wildman, Wm	North Andover.

Cotswold Sheep.

Arlt, Adolph	Sawyer.
Bryant, Geo. E	Madison.
Day, Chas	Hudson.
Harding, Geo	Waukesha.
Lawrence, A. W	Sturgeon Bay.
Morey, James	Merrimack.
March, John	Shullsburg.
Nash, L. M	Centralia.
Roberts, Mark W	Bellefountain.
Smith, John M	Eau Claire.

Southdown Sheep.

Fuller, A. G	Seymour.
Fellow Bros	Foscoro.
Sheldon, B. F	Brandon.

Poultry Breeders.

Ballheim, Frank	South Osborn.
Belding, C. H	Shopiere.
Bishop, Dr. L. A	Fond du Sac.
Brabazon, J. R	Delavan.
Coleman, J. E	Evansville.
Ewins, Wm	Palmyra.
Gibbons, G. B	Baraboo.
Green, R. C., & Co	Albion.
Hamea, A	Bloomington.
Ketchum, I. P	Madison.
Kenling, Julius	Hope.
Leonard, F. A	Door Creek.
Martin, Ed	Fond du Lac.
McFarland, Wm. H. (Brahmas and Y....)	Madison.
Oak Grove Poultry Yards	Platteville.
Richmond, H. C	Lodi.
Scott, M. J	Bloomington.
Smith & Hayes	Madison.
Smith, J. W	Sparta.
Steves, J. B	Louisville.
Thomas, J. W	Chippewa Falls.
Thompson, Paul	Blair.
Tilson, Mrs. Ida E	W. Salem.
Tong, Job	Sturgeon Bay.

Cheese Factories and Creameries.

Antone, A	Belgium.
Allen, Merreck T	Springhill.
Algoma Creamery Co	Oshkosh.
Armstrongs	Armstrong's Corners.
Airhart, E	Mitchell.
Baltz, C. W	Calumet.
Bamford, Henry	Plymouth.
Bartram, G. A	Rural.
Barrett, Wm	Dykesville.
Bean, F	Calvary.
Best, John	Johnsonville.
Bates, A. M	Mondovi.
Bertram, C	Johnsburg.
Bitter, John	Sheboygan.
Benscke, D	Fontenoy.
Beyer, H. S	New Denmark.
Bleecker, J. R	Hubbleton.
Braun, C	Sullivan.
Bovcher, L	Dyksville.
Bovina Cheese Factory	Shiocton.
Bourgeois, H	Mt. Calvary.
Brehm, Fred	Sheboygan.
Broser, John	Dundee.
Brobet, John	Gilmanton.
Bristol, A	Oakfield.
Blonier, A	Johnsburg.
Brayton, Mrs. J	Fond du Lac.
Brown, Ira A	Fond du Lac.
Brown, O. P	Byron.
Busher, C	Ada.
Carrier, S. E	Oak Centre.
Campbellsport Factory	Campbellsport.
Catlin, J. P	Royalton.
Campbell & Hutchinson	Lake Mills.
Campbell & Dodge	Lake Mills.
Carlin, James	Greenbush.
Casey, Michael	Watertown.
Chaplin Factory	Plymouth.
Christians, H. C	Johnsons Creek.
Church, M. H	Delavan.
Carr & Gessling	Glendale.
Clark, J. J	Berlin.
Cosgrove, M	Rathbun.
Dasson, John	Sheboygan Falls.
Dasson, Jacob C	Sheboygan Falls.
Damrow, Louie	Franklin.
Deitch, Chas	Plymouth.
Debauche, Oliver	Brussells.
Dulmer & Rowerdinke	Oostburg.
Dupont, G	Robinsonville.
De Schmidt, Isaac	Cedar Grove.
Dailey	Mitchell.
Eastman, Chas	Plymouth.
Ehren, John	St. George.
Ehrlich, Otto	Sheboygan Falls.
Erdman, Will	Plymouth.
Erbslveszer, H	Sheboygan Falls.
Erpstolszen, Edward	Howards Grove.
Evans, Dave, Jr	Berlin.
Ehrhart, E	Malone.
Eggers, Geo	Fond du Lac.
Estabrook, C. E	Fond du Lac.
Fargo, E. B	Lake Mills.
Fasse, Adolph	Johnsonville.
Fills, Joseph	Luxenburg.
Flath, W	Glenbuelah.
Floral Creamery	Omro.
Floyd, Chas	Eureka.
Foster, J. H	Koro.
Fox, M. B	Glendale.
Frick, John	Plymouth.
Fleishman, M	St. Cloud.
Gates, C. W	Winooski.
Gaeble, Geo	Sheboygan.
Gerlach, Chas	Grafton.
German & Wyman	Lake Mills.
Gibbs, Charles R	Whitewater.
Gibson, Chas	Lind.
Gilow, Henry	Cedarburg.
Goldbeck, Wm	Plymouth.
Gosen, A	Walhaine.
Greesel, Anton	Luxemburg.
Green, M. H	Reeseville.
Griffith, J. N	Whitewater.
Guernsey Creamery	Koshkonong
Grolenhuis, G., & Co	Cedar Grove.
Gartman, August	St. George.
Geffin, W	Lancaster.
Gehl, M. N	Nenno.
Goutermont, Wm	Peebles.
Geulich, H	Calvary.
Harris, John	Spring Prairie.
Halsley, C	Elmore.
Hobbs, W. A	Brandon.

Cheese Factories, Etc.—Continued.

Hobbs, A. J	Brandon.
Haskins, J. A	Waupun.
Hadcock, E. W	Waupun.
Ham, W. A	Fox Lake.
Hazen, C	Ladago.
Haggerty, S. A	Mt. Sterling.
Heisdorf, John	Edwards.
Helmer, L	Plymouth.
Hornick, Geo	Rhine.
Hornick, Philip	Rhine.
Hartman, John	Gibbsville.
Hopeman & Kaffers	Gibbsville.
Hopeman, Wm	Cedar Grove.
Haen, John H	Sheboygan.
Hoard, A. R	Ft. Atkinson.
Hilltop Cheese Factory	Watertown.
Hustisford Cheese Factory	Hustisford.
Hartie, George	Ft. Atkinson.
Hubbell & Co	River Falls.
Harrnese, Joseph	Darbellay.
Halle, Victor	Lincoln.

Ingalls, E. P	Milford.
Innis, W. T	West Rosendale.

Jones, D. D	Fond du Lac.
Jenkens, E. S	Rosendale.
John Bros	Sheboygan Falls.

Kissinger, Paul	Waupaca.
Kipky Grove Factory	Lake Mills.
Kalmerton, Chas.	Sheboygan Falls.
Knowles, C. M	St. Cloud.
Kirchheck, Henry	Howards Grove.
Kuehne, C. W	Johnsonville.
Koenig, Henry	Sheboygan Falls.
Kuntz, Geo	Sheboygan Falls.
Karsteaodt, C. F. F	Mosell.
Kunce & Co	Sheboygan.
Krebsbeck, J	Johnsburg.
Kirby, N. W	Brownsville.
Kecher, John	Campbellsport.
Koch, G. G	Knowles.

Luecke, Fred	Howards Grove.
Lefebore & Son, O	Schiller.
Lutze, A	Sheboygan.
Leroy, Will	Waldo.
Locher, L	Johnsburg.
Leonard, A	Dotyville.

McAllister, J. D	Mills Center.
McCanna, C. B., & Co	Burlington.
McKinnon, M	Sheboygan Falls.
Mc-redle Bros	Ft Atkinson.
McFarlane, W	Eden.
McKinney, F. M	Fond du Lac.

Meichels, M. J	Calumet Harbor.
Manel, W	Ashford.
Murray, John	New Cassel,
Moerich, M	Calumet Harbor.
Mathews, Jos	Auroraville.
Mayhew, G. C	Greenbush.
Murray, John	Parnell.
Maves, Otto	Howards Grove.
Miller, J. W	Scott.
Melendy, E. B	Sheboygan Falls.
Millard, Chas. C	Lake Mills.
Marshall, Robert	Lake Mills.
Mansfield, G. H	Johnsons Creek.
Milford Road Factory	Milford.
Mosea, J. R	Ogdensburg.
Murphy, A. L	Hortonville.
Meyer, H. F	Greenleaf.

Nathway Bros	Pine Grove.
Noyes, H. J	Richland, city.
North Road Factory	Milford.

Oatman & Bros	Lake Geneva.
Ochs, Julius	Howards Grove.
O'Connell, James	Pins.
O'Connell, John H	Beechwood.
O'Connell, E. M	Beechwood.

Paulsons, E. B	Rosendale.
Peters, W	Wayne.
Pauly, J	Calvary.
Peebles, E	Peebles.
Petri, A	Calvary.
Phillips, F	Brothertown.
Payne, J	Edwards Mills.
Port, Nick	Belgium.
Page Bros	Berlin.
Perrot, Lewis	Greenville.
Perriot, Louis	Belgium.
Piperville Cheese Factory	Piperville.
Peck, Joseph	Waldo.
Pfiel, Val. G	Greenbush.
Prang & Co	Sheboygan Falls.
Pfeiffer, J. T	Franklin.
Pierson, Nick	Belgium.

Quick, John	Lamartine.

Ray, Wm	Empire.
Reitz, H	Dotyville.
Redington, James	Pins.
Roeder, H. G	Edwards.
Rowerdink & Dulmer	Gibbsville.
Reneking, C	Franklin.
Roeder, F. W	Johnsonville.
Riess, Henry	Elkhart.
Reseburg, Louis	Franklin.
Rehn, H. A	Franklin.
Ripon Creamery	Ripon.
Roach & Seeber Co	Waterloo.
Riverside Factory	Milford.
Robinson, A. E	Waupaca.
Roth, Joseph	Ellisville.
Rhodes, Thomas	Watertown.

Sargent, S. W	Brandon.
Stratz, J. A	Woodhull.
Smidt, A	Fond du Lac.
Sice, G. W	Mitchell.
Sackett, H. F	Wauconta.
Steiner, J. B	Lomira.
Schafer, P	Calumet.
Stollenwert, J. J	Calvary.
Stoddart, W	Waupun.
Skinner, S. E	Brandon.
Smith, J. A	Glenbeulah.
Stracks & Nevill	Alto.
Stephany, A	Malone.
Stephany, P	Peebles.
Stellen, G. W	Brandon.
Sebling & Grolenhies	Oostburg.
Schibe, Herman	Plymouth.
Strub, J	Rhine.
Stecker, John	Plymouth.
Swann, Robert	Cascade.
Schultz, Herman	Johnsonville.
Schneider, Edward	Howards Grove
Schueller & Co	Belgium.
Schueller, John B	Belgium.
Schmidler, Frank	Dacade.
Scheid, John	Ada.
Spranger, M. H	Oostburg.
Springham, Wm	Sheboygan.
Smith, John A	Glenbuelah,
Shields Factory	Hubbleton.
Stilson & Co	Oshkosh.
Snyder	Waukaw

Cheese Factories, Etc.—Continued.

Smith, J. H.	Waupaca.
Sherman, Adolph	Plain.
Smith & Eastman	Saukville.
Stubbs, Chas.	Lyons.
Smithurst & Potter	Seneca.
Town, J. W	Waupun.
Thayer Refrigerator Co.	Union Grove.
Tenddchel, August	Sheboygan Falls.
Thackray, J. H.	Glenbuelah.
Ternes, John.	Belgium.
Teronda, Henry	Oostburg.
Themer, C. F.	Sheboygan.
Tenpass, Garrett	Hingham.
Vaughn, W. A.	Wauzeka.
Vanderwall, John	Cedar Grove.
West, Walter	Elkhorn.
Wagner, J	Calvary.
Watson, D. R	Fond du Lac.
Wirtz, M	Dotyville.
Wirtz, Geo	Dotyville.
Whiting, N	Waupun.
Walters, A	Eden.
Whiting, A. C.	Ladoga.
Wagner, Mat	Malone.
Wagner, Louis	Thiensville.
Webber, N. W	Lima Center.
Waumandee Cheese Factory.	Waumandee.
Winn & Breeden	Richland Center.
Waterloo Cheese Factory	Waterloo.
Wedenmeyer, Theo	Waterloo.
Weiner, Henry	Weiner.
Woudruff, W. H	Green Bay.
Werg, Joseph	Darbelley.
Wittig, F	Fontenoy.
Widder, Herman	Hingham.
Webb, Geo	Greenbush.
Wolf, August	Cascade.
Wester, Melchion	Belgium.
Wellenstein, John B.	Belgium.
Wiselink, John	Gibbsville.
Walvoord, Tony	Cedar Grove.
Walvoord, Henry	Cedar Grove.
Widder, Fred	Sheboygan.
Winch, Henry	Mosell.
Yanneys, Wm	Medina.
Zimmerman, Antoine	Saukville.

UNIVERSITY OF WISCONSIN.

BOARD OF REGENTS.

THE STATE SUPERINTENDENT, EX OFFICIO.

STATE AT LARGE,	HON. GEO. H. PAUL, PRESIDENT.
STATE AT LARGE,	HON. E. W. KEYES, CH'N EX. COM.
1ST DISTRICT,	HON. J. G. McMYNN.
2D DISTRICT,	HON. HENRY D. HITT.
3D DISTRICT,	HON. GEO. RAYMER.
4TH DISTRICT,	HON. GEO. KŒPPEN.
5TH DISTRICT,	HON. HIRAM SMITH.
6TH DISTRICT,	HON. FRANK CHALLONER.
7TH DISTRICT,	HON. C. H. WILLIAMS.
8TH DISTRICT,	HON. WM. P. BARTLETT.
9TH DISTRICT,	HON. R. D. MARSHALL.

Committee of Board of Regents in Charge of Farmers' Institutes.

HON. HIRAM SMITH, Chairman,	SHEBOYGAN FALLS.
HON. H. D. HITT,	OAKFIELD.
HON. C. H. WILLIAMS,	BARABOO.

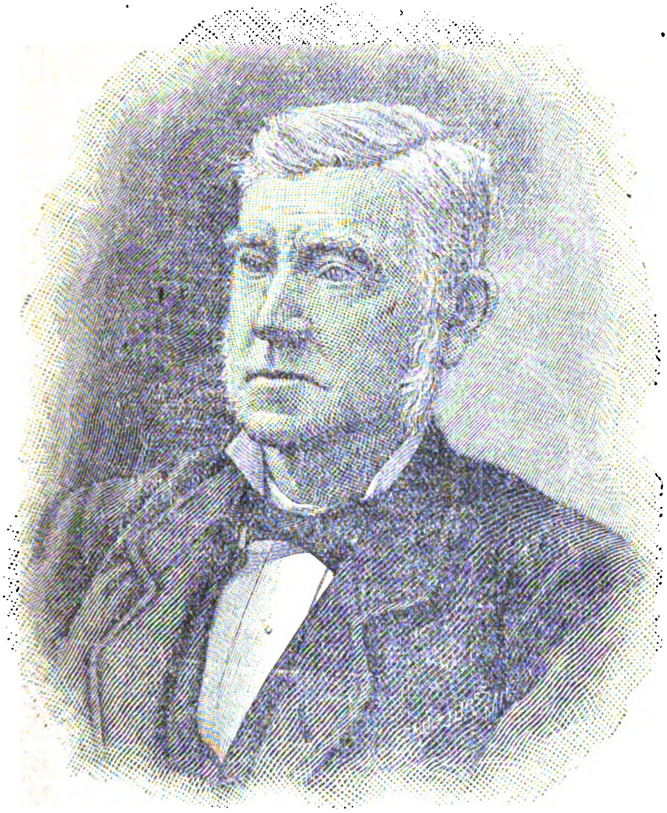
W. H. MORRISON, Superintendent.

Office — No. 12, Capitol,

MADISON, WIS

LIST OF FARMERS' INSTITUTES, 1888-9.

Towns or Cities.	*Counties.*	*Date.*
Kewaunee	Kewaunee	Nov. 13, 14
Friendship	Adams	Nov. 20, 21
Amherst	Portage	Nov. 23, 24
Mondovi	Buffalo	Nov. 27, 28
Bloomington	Grant	Nov. 27, 28
Mt. Sterling	Crawford	Nov. 30, 1
Platteville	Grant	Dec. 4, 5
Dodgeville	Iowa	Dec. 6, 7
Darlington	La Fayette	Dec. 11, 12
Brodhead	Green	Dec. 13, 14
Plainfield	Waushara	Dec. 18, 19
Westfield	Marquette	Dec. 20, 21
Berlin	Green Lake	Dec. 26, 27
Hortonville	Outagamie	Dec. 28, 29
Eau Claire	Eau Claire	Jan. 9, 10
Eggleton	Chippewa	Jan. 11, 12
Baldwin	St. Croix	Jan. 11, 12
Osceola Mills	Polk	Jan. 14, 15
River Falls	Pierce	Jan. 15, 16
Menomonie	Dunn	Jan. 17, 18
Durand	Pepin	Jan. 17, 18
Arcadia	Trempealeau	Jan. 22, 23
Viroqua	Vernon	Jan. 22, 23
Fountain City	Buffalo	Jan. 24, 25
Sparta	Monroe	Jan. 24, 25
West Salem	La Crosse	Jan. 29, 30
Reedsburg	Sauk	Jan. 31, 1
Oregon	Dane	Feb. 5, 6
Delavan	Walworth	Feb. 5, 6
Janesville	Rock	Feb. 7, 8
Union Grove	Racine	Feb. 7, 8
Port Washington	Ozaukee	Feb. 11, 12
Sheboygan Falls	Sheboygan	Feb. 13, 14
Manitowoc	Manitowoc	Feb. 15, 16
Black River Falls	Jackson	Feb. 18, 19
Mauston	Juneau	Feb. 20, 21
Waupaca	Waupaca	Feb. 26, 27
West Bend	Washington	Feb. 26, 27
Fond du Lac	Fond du Lac	Feb. 28, 1
Kenosha	Kenosha	Feb. 28, 1
Portage	Columbia	Mch. 5, 6
Beaver Dam	Dodge	Mch. 7, 8
Phillips	Price	Mch. 11, 12
Medford	Taylor	Mch. 12, 18
Wausau	Marathon	Mch. 12, 13
Colby	Clark	Mch. 14, 15
Grand Rapids	Wood	Mch. 14, 15
Green Bay	Brown	Mch. 19, 20
Richland Center	Richland	Mch. 19, 20
Chilton	Calumet	Mch. 21, 22
Lake Mills	Jefferson	Mch. 21, 22
Waukesha	Waukesha	Mch. 26, 28



In many respects that was a remarkable little band which associated itself for the purpose of founding the Wisconsin Dairymen's Association. Their sole object seems to have been the aggressive advancement of dairying in Wisconsin, and wonderfully well have they succeeded. It is common enough to see men join together for an implied common purpose, but time usually shows that some of the number, at least, are seeking personal preferment or aggrandisement, and dissension and troubles usually sap much of the possible strength of the organization, while jealousies are only too common. From the first we observe a different spirit ruling in this society, where each member seemed willing to sink his personality out of sight for the good of the society, and to rest content with doing the work assigned him and seeing the society advance. What is the result? To-day the Wisconsin Dairymen's Association stands as the strongest society of the kind in America, if not in the world. Every one of its patient workers, instead of losing personality by thus shutting out jealousies and aspirations has found himself known and respected all over the State, while some of the number have gained a national reputation by their words and deeds. It is the old story, so hard to learn,—they who would gain real honor must do so by patient well doing.

Hiram Smith, the subject of this sketch, is known to every farmer of the State, and stands a respected representative of the farming people. Years of patient labor with co-workers in the State Dairymen's Association gave him training in thinking, speaking and writing, and made possible farther advancement to positions of honor and trust. What he has done for dairying and the dairy association is enough for one man, either in the amount of sacrifice and labor undergone, the good done, or the honors which have followed; but his sphere was destined to be large. In 1878, he was appointed a Regent of the University, with the understanding that the agricultural side of that institution was to be pushed to its proper position, as desired by the people and needed by the State. From the date of his appointment the department took on new life, and has continued to grow and expand. A series of farmers' meetings were planned, and Mr. Smith, with the professors of agriculture and invited speakers, went about the State holding a series of farmers' meetings, or what would now be called, farmers' institutes. A professor of agriculture was appointed, who should give his whole time to agriculture, and then came the experiment station and the farmers' institutes, the character and work of which are so well known and appreciated by our people. The same spirit which was carried into the Dairymen's Association was taken into the Regency, viz.: That hard, patient work was called for, and, primarily, nothing else.

Those who have wondered at the success of our institutes and the agricultural department of the University generally, should bear in mind that nothing, especially nothing good, comes by chance in this world, and that the Regents of the University patiently and laboriously planned and arranged what has been so successful and smoothly carried out.

The subject of our sketch has been charged by some as being too much of a partisan for dairying, but how could he be otherwise? The central thought of his life and main-spring of action has been, that a single thing well done is worth a thousand half-hearted attempts, and that proficiency and experience are too valuable adjuncts to success to be lightly thrown aside. He started in as a dairyman and has seen no reason to change his course. Let those who follow other lines stand as firmly to their purpose as he has to his, and Wisconsin's agriculture will lead every State in the Union. Those who know him best, long ago learned his broad charity and sympathy for the man in dead earnest in any line of profitable agriculture.

Such a life is of untold value to our agricultural people. It shows that by well doing and unselfishness a farmer can rise to the highest esteem in the hearts of his fellow-citizens, and be respected by all classes. That good work tells in agriculture just as well as in law or medicine, and that patient continuance in one course, with a desire to do good work, is the way to attain distinction and lasting honor. To our young men who are to follow farming, such an example is worth untold millions, for it shows that there is something better in this life than simply piling up money, and that real success is born of industry, intellect, and unselfishly working for others.

Closing Farmers' Institute—1888.

HORTICULTURAL SESSION—MARCH 27.

THE HORTICULTURE OF WISCONSIN.

By B. S. HOXIE, Rock County, Wis.

First Paper.

JOHN GOULD, in the Chair:

Our Fruit Crop.—The dairymen tell us that the products of the dairy in our state amount now to the sum of $20,000,000 annually. Our lumber is worth about $27,000,000, we raise nearly 21,000,000 bushels of wheat, and sell hogs to the amount of $10,000,000. Now, these figures are valuable; the sums are enormous, and, when I bring alongside of them the fruit crop of Wisconsin, you will say it is a small item, for our last census shows that we produced in the year 1885, 1,675,000 bushels of apples at a value of $639,000, grapes valued at $30,000, and a berry crop valued at $180,000. Now, this appears quite insignificant, when compared with the larger amounts I have given, and yet they are below the actual yield; for there are hundreds of bushels of apples, tons of grapes, and crates of berries which can only be estimated by the size of the average small boy's pocket, for who would ever think of looking there for a quart of wheat, a pound of butter, a chunk of cheese or a small pig, for a boy to nibble on.

Measure of Values.—I know the common opinion is that a thing is worth what it will bring in market. Is that true? Our prominent dairymen tell us that a cow does not more than earn her keep if she produces only 150 pounds of butter annually. The cost to produce a bushel of wheat is about 50 cents, and lumber, in such a winter as this, is manufactured at a small margin of profit, and we are gravely informed that if Canadian lumber is admitted duty free, it will drive our lumbermen out of the market, while the average value of an acre of wheat has fallen off from $12.48, in 1880, to $8.25, for the year 1887. Now, these data are from reliable sources, and would seem to indicate that values should not always be measured in bushels or acres, but that we should attach some importance to the cost of production, and the net results.

Money in Fruit Growing.—I know that some people imagine that fruit growing or market gardening is rather small business, and because we cannot produce apples by the million bushels, and every man raise them as easily as he can burdocks and thistles, that there is no money in it. Now, while it is true that our state is not so favorable for this fruit as is Michigan, yet there are portions of it where apple orchards, for commercial purposes, yield a good profit to their owners. Mr. A. L. Hatch, of Ithaca, Richland County, in 1886, raised 2,000 bushels for market; and J. M. Smith, of Green Bay, as a market gardener, makes more clear profit from forty acres of land than most of our farmers do from ten times that amount, for his sales reach some $14,000 annually.

Small Fruits.—In small fruits Wisconsin has no rival in quantity or quality, and in strawberries I think we outrank any state in yield per acre, while for varieties of grapes that will mature in our climate, we have them as good as can be grown in the United States. The net profit per acre of small fruits, such as strawberries, raspberries, blackberries, etc., is from $50 to $150 per acre, and this industry with us is rapidly on the increase. J. M. Smith, who has just visited California as a delegate to the American Horticultural Society, in the conclusion of his report, has this to say:

> "In the small fruits, such as strawberries, raspberries, blackberries and currants, I am satisfied we can far excel California in quality and quantity. Their apples are far below ours in quality; neither is the yield very large, and we have fully as large a proportion of comfortable homes in Wisconsin as any state in our Union, and I have traveled through many of them and speak from knowledge."

Quality and Quantity.—The quality and quantity of our fruit is just beginning to be appreciated, and though I cannot now give the number of acres, I will mention that some of our grape growers have vineyards of six or eight acres, and at Ripon there are about 200 acres in blackberries. That city is getting a grand reputation for this kind of fruit, and the plantations in that vicinity are increasing every year; in fact this is true of all our fruit growers all over the state, and, moreover, they are meeting with large success. Mr. Anderson, one of our small fruit growers at Neenah, says that one acre in grapes will bring more dollars and cents than twenty acres in grass. Another gentleman at Appleton has successfully fruited over forty varieties of grapes the past season; so there is no longer any reason why every householder in Wisconsin should not raise enough of this valuable and easily produced fruit for his entire family.

Thirty years ago where there was one growing grape vine there is to-day more than one thousand. Mr. J. S. Hubbard, of Fredonia, New York, says there are in that state over forty thousand acres of grapes grown for table use. Three to four tons an acre is a fair crop, and they can be grown at a fair profit, for three to four cents per pound (Concord is the prevailing variety). From one township in Ohio, last year, there was shipped 1,800 tons of grapes, and it was no unusual thing for seven car-loads a day to be shipped from one station. There is no fruit grown that is more healthful than the grape, and I can see no reason why we could not have dyspepsia grape cures in this country, as they do on the Rhine, for it is quite sure that the future man will eat more fruit and less meat.

Florists' Sales.—Now, let me go outside of our state for one other fact to illustrate my subject. In 1844 one of the principal florist firms of New York City did well if their sales on New Year day amounted to $200, but last year that firm sold 50,000,000 plants and flowering shrubs, and their aggregate sales amounted to $2,500,000. Mr. J. M. Smith gives as one reason why he is a horticulturist, that it affords a "happy competency," and if I were to write a complete volume on horticulture, I could give it no greater potency than that one sentence, as a final argument.

Horticulture in the Schools.— Horticulture and botany should be taught in all our public schools, for horticulture means, in quite a large sense, intensive agriculture, and a good knowledge of botany I am sure would be quite as useful as that of algebra. In France, Austria, and Sweden, there are thousands of schools with gardens attached to them, under the care of competent teachers. It is quite common with us to plant trees in our school and college grounds, but we very rarely see fruit or vegetables. I do not believe that the boys and girls would be vandals if this were the case, but I do believe they would grow up to be truer men and women. Do you know a school-yard of beauty? If you do, it is one where trees, plants and flowers have their proper place in it. For I think our highest standard of beauty in nature, is largely confined to trees, groves and flowers, and our best teachers are those who teach from nature The horticulturist of Wisconsin should know that thousands of school-grounds in our state need to be planted to trees and shrubs.

Trees in School-yards.— Children need the influence which can be imparted by trees and flowers, and we can do it in no better way than by planting them in every school-yard. Railway stations need the ornament of trees and plants, when it can be done with such a trifling expense. We learn by contact and association, and if the associations of child life are not filled in with the useful, the good and the beautiful they most certainly will be with the ugly and harmful.

Parks.— Every village and city in our state should have its park, or parks, and these grounds should be attractive for their beauty of art and nature. Even the densely populated city of London has 30,000 acres in parks. If saloons are the breathing places of hell, parks in the city are paths to joy and the open gates to heaven. Would the people here in Madison for a price vote to have this park, or this capitol ground, stripped of its trees? I think not. But how many boys and girls in this city can give me the common name of every tree in this park, or its commercial use or value, and why? Every boy and girl should not only learn the names of the plants and trees they come in contact with, but every farmer's boy should know how to properly plant a tree and care for it.

The Field of Horticulture.—Horticulture is not simply the setting out and pruning of an orchard tree, or to raise apples for the market. Plants and trees of all kinds, birds and insects, their preservation or destruction, all of these, claim the attention of the Wisconsin horticulturist.

Rare plants, trees and shrubs are being imported or produced in our own country every year, and Wisconsin growers are not far behind in this work. The men who originated the Concord grape, the Wilson strawberry, or the Wealthy apple are public and national benefactors, and possibly these benefactions may take in our own Wisconsin, by including the Wolf River apple, the Northwestern Greening, and the Jessie strawberry. With all or any of these I have no special pleading to make, but I am quite certain that nearly every Wisconsin farmer can raise all the summer and late fall apples that his family needs at a minimum of cost, when the larger item of pleasure, and the abundance of healthful food are taken into account. I know of many farmers who continually say we cannot raise apples in Wisconsin, whose boys just as continually every year poach on their neighbor's orchard. Suppose you have planted some varieties which have failed. Is this a sufficient reason for neglecting to plant another tree? Is there any crop which is always sure, except it be that of vice and weeds? The road to success in any calling is not by the way of indolence, and though fruits are so luscious, trees plants and shrubs so beautiful, yet he who produces them does not always live in a state of bliss, for his enemies are counted by millions, and his friends at harvest time by the hundreds.

Discussion.

MR. J. M. SMITH.—I want to ask Mr. Hoxie what profits he named per acre for small fruit?

MR. HOXIE.—I think I named a fair profit to be from $30 to $50.

MR. SMITH.—Is that the best you can do?

MR. HOXIE.—Perhaps we can do a good deal better than that, but when a man talks about the profit he can make on an acre of wheat which costs fifty cents a bushel to produce, that is a pretty good profit. I think Mr. Hamilton, of Ripon, the fruit grower, will give us a larger profit, and Mr. J. M. Smith, who asks the question, a much larger profit.

MARKET GARDENING.

By J. M. SMITH, Green Bay, Wis.

Second Paper.

The Soil.—I have in my library at home, quite a number of books on gardening, the best containing about five hundred pages, and I am told by our friend Morrison that I can have twenty minutes to tell you about market gardening, but perhaps I can tell, in that time, the most that I know. I will give you only the outlines. I prefer a light sandy loam for the following reasons: It is an easier soil to cultivate. A friend of mine who is doing something in the line of gardening on a very heavy clay, estimates that it costs him three times as much per acre to cultivate a given crop upon his soil, as it does me upon my soil, mine being a light sandy loam.

Another reason why I like it best is that it is a little earlier in the spring, the crops will grow upon it a little faster, and they will be ready for the market a little earlier, which gives the light soil a great advantage. The crops may not be any larger in the aggregate, but very often you have three or four days or a week advantage in earliness of the crop and that will just make the difference between a handsome profit and a handsome loss, if you might call it so, so that other things being equal, let us have the light sandy loam.

The Manure.—My friends, no soil is rich enough to make garden upon and do it successfully without artificial fertilizers. Hence, we must have it manured, and I like to put on at the rate of thirty to forty loads per acre each year. I manure all my land every year, no matter what the crops are, and sometimes twice a year. You may think that it is heavy manuring, and so it is, but we want to take two crops, sometimes three, off a piece of land in the course of the season, and that we often do, even as far north as Green Bay, and I have tried a number of times to get the fourth one, but have never made a brilliant success of that crop.

The First Planting.—Our first planting in the spring commences as soon as the ground is fit to work; we don't wait a day after this, and it consists of peas, common early peas, the earliest varieties that we can get. If planted so early, they will be getting along slowly even in cold weather when the ground is not frozen, and if the ground freezes afterward, they will come up. It will hurt some of the more tender varieties, but the common early pea, the extra early Dan O'Rourke, the early Philadelphia (all these are really the same variety) we plant as early as the ground is fit, in rows three or three and a half feet apart, and then we sow radishes, or some quick growing crop, between the rows, that will be out of the way before the peas come on. The peas in their time are out of the way to put in another crop—a crop of late corn, cabbages or rutabagas, something of that kind, so there is no trouble is getting on a piece of land, that is well cared for, three crops.

Any of these very early varieties of peas are all one and the same, and they are good. Among peas, as a general rule, the sweet or sugar varieties, the wrinkled varieties, are not as hardy as the others, and should not be planted as early, because they will either rot in the ground or, if they come up, will be feeble and not make a nice crop; so do not plant them until the ground gets warm.

Parsnips—Are another thing that may be sowed very early, provided the ground is in good condition. Carrots, beats, turnips, all of that class, will bear a little freezing, after they come through the ground, without being injured.

Asparagus.—I have forgotten one thing—the asparagus bed. That is one of the first things to be cared for, and no market garden is complete without it.

On this subject a great deal has been said and written that is pure unadulterated nonsense. In a few words, I will try and tell you how I make asparagus beds, and I have never seen asparagus that excelled mine except once in Philadelphia, where there was some from Paris that was better than mine.

Making the Beds.—My beds are made in the following manner: The ground is a light sandy loam, manured very heavily—all we can plow under. After plowing and harrowing, we take a shovel-plow and make the rows three or three and a half feet apart, and six inches deep, at least. In these furrows we place our plants, one year or two, perhaps three, but not more than three-year-old plants. From the older roots, you don't get such a good crop; about two years old are the best. Plant them deep enough so that the ground from which the stalk starts from the plant will be, when it is leveled off, from four to six inches beneath the top of the soil. Put the plants in this way about fifteen to eighteen inches apart. After they are in, the roots spread out and simply fill up your furrow, and your bed is made. It is a very simple matter, and you have only to keep the weeds and grass out and let it grow. The following spring, when the snow goes off, cut off the tops that have grown during the year and put on some more manure, always estimating that you can't get too much manure on an asparagus bed. We take our common six-tine manure fork and just fork it in, and it is done very rapidly; but be careful not to dig deep enough to injure the roots of the plants. Then, rake off your bed and there it is ready for another year, and your work done with the exception of keeping out the weeds.

Cutting.—The plants will bear some cutting the second year, but not much. You may cut them for two or three weeks or possibly a month, always remembering to cut the stalks clean, no matter whether they are large enough for market or not; but cut them off clean so that when the bed grows up, it will all come up together. At the beginning of the third year, you can cut quite largely, but it will not cut at its best until the fourth or fifth year, but to make up for that, it is good for a life time. My oldest beds are, I think, over twenty years old, and they are certainly as good as they ever were, and I think have been improving within the last five years. Now, gentlemen, that is all there is to it, and I hope you all will make asparagus beds this spring, if you haven't them. There is no article in our garden which will raise so large an amount of food as asparagus, and it takes but a small bed to feed a family during the entire season.

Vine Crops.—Now, for the other crops. I have mentioned these few that will bear setting or planting before the frosty nights are gone. There is a certain list that will not do well if chilled or frosted. Among these are the vines—cucumbers, or melons or squashes. If they are even chilled they will be damaged, and will not make a first-rate crop. The same is true with our beans; they are very tender, particularly Lima; hence, we must be careful in planting those to plant as early as possible, but not too early.

Our sweet corn, you all know, will stand just about the same amount of cold that the common field corn will, although I don't think it is quite as ready to come up if the weather is very cold.

Early Crops.—In market gardening we want to bear in mind to get our crops not only good, but just as early as possible, for that is generally where the profit comes in. Let me illustrate this. A number of years ago, I had a crop of cucumbers that was very nice and very early. We had none in the market, with the exception of those coming in from the South. I put the price down just low enough to keep out the Southern cucumber, and keep the market myself, and for a week or ten days I was getting from thirty-five to forty cents a dozen for all we could pick and carry to the market. On one certain morning, some six or eight or a dozen growers came in with their cucumbers, and the price dropped from thirty to forty cents down to six or eight. In fact, the market broke all to pieces. I had already sold enough to give me a nice profit on my crop, while my neighbors who had been a week behind, scarcely got enough to pay for the picking and hauling.

You will find this to be true with regard to many crops and peculiarly so with early peas; those who get the first early peas will reap the profitable harvest.

Large Crops.—In speaking on this subject, I can only throw out a few of these brief hints, as my time is limited, and I will only say the rule is to get very large crops and to get them very early, put them up in the best possible manner, and then in marketing, to get just as near the consumer as possible. Do not throw them on the market unless it is an absolute necessity, and if you do throw them, throw them on somebody else's market besides your own. If I have a surplus of any one thing that I cannot sell at home, and it is necessary for me to throw it on the market, I send it to Chicago and tell somebody there to sell it for what they can get, though we don't often have anything of that kind.

Discussion.

PROF. CHAMBERLAIN.—Where can you get two year old plants of asparagus?

MR. SMITH.—I think there is no difficulty in getting them; I think most nurserymen, growers, have them.

QUESTION.—Can't you get any good asparagus roots out of an old bed, six or eight years old?

MR. SMITH.—No sir. You can get roots enough, but the product will be small and spindling.

MR. HOXIE.—Isn't it quite an easy matter to raise them from the seed?

MR. SMITH.—Yes; but, of course, it takes time.

MRS. BARLOW.—You can get roots from Mr. Lovitt, of New York.

MR. TOOLE.—We can get them from Curry Bros., Milwaukee, and Hiram Sibley, of Chicago.

PROF. CHAMBERLAIN.—Have you any preference for variety?

MR. SMITH.—I have my doubts whether there is more than a single variety. My impression is that the so-called Conover's Collossal which I am growing, and the other varieties, are really the one old variety, grown under different circumstances, more favorable, of course. I have some coming on now from Paris, a variety of French asparagus, said to be the finest in the world. I don't know what it will prove to be.

MR. KELLOGG.—How much manure can you plow under?

MR. SMITH.—If it is fine manure, I can plow under seventy-five to one hundred loads to the acre.

PROF. CHAMBERLAIN.—One hundred loads wouldn't be half of one inch deep.

MR. SMITH.—If they are good large loads, I think they would. I would recommend to all farmers and all gardeners to have a good hand cultivator, and a good Mathew's seed sower. I find nothing equal to that.

QUESTION.—How late in the season do you cut your asparagus?

MR. SMITH.—Generally about the 10th of July, sometimes as late as the 15th, depending on how early we begin in the spring.

CAPT. PUTNAM.—In the discussion of this question, I see you ignore the onion.

THE CHAIRMAN.—The onion generally speaks for itself.

MR. SMITH.—That is a plant that should be sown very early in the spring. It needs damp, cool weather to get a start, but after it is started it will bear a great deal of dry weather, but it would be killed by a very early drouth. With cabbage, I have generally failed to get a very large crop, if I got my seeds in early.

MR. LOCKWOOD.—Is there any special fertilizer used on onions?

MR. SMITH.—I have found nothing equal to good barn-yard manure or a compost heap.

MR. LOCKWOOD.—I have raised a thousand bushels of onions to the acre, with sulphur as a special fertilizer.

MR. SMITH.—What did you put on the ground before you put on the sulphur?

MR. LOCKWOOD.—I put on plenty of the old stand-by, barn-yard manure, but I never succeeded in raising so large a crop of onions without special fertilizers. I put on to one-eight of an acre, seventy-six pounds, pretty highly seasoned. That field cost me just seven and a half cents to the bushel for my onions, including the seed and the cultivation, and fertilizers, and they were marketed in Toledo, at fourteen cents a bushel.

MR. MORRISON.—To what do you attribute your great success as a gardener, Mr. Smith?

MR. SMITH.—A good soil, well adapted to the purpose, well drained, heavily manured and thoroughly cultivated, just as thoroughly as I could do it with my best knowledge of how to do it. I have been asked about manure. I will say I depend on the barn-yard manure, and the materials which go into the compost heap in the garden. I have some stock and we haul a great deal from the city, and we make a great deal from the refuse in the garden.

MR. TOOLE.—Is not your situation different from others as to having water below?

MR. SMITH.—We have to dig from six to fifteen feet, probably nowhere deeper than fifteen feet, perhaps not more than twelve.

MR. Putnam.—I want to ask Mr. Lockwood how he applies the sulphur.

MR. LOCKWOOD.—I apply it just as I sow the onions. Immediately on the preparation of the ground, sow the sulphur and sow the onions; sow it as we do landplaster on clover.

MR. SMITH.—For early potatoes, I prefer good wood ashes, to any barnyard manure we have ever tried, and I would put it on at the rate of fifty bushels to the acre, and even more if I could get it. I have never tried coal ashes, but chemists tell us they are not valuable. I sow the ashes broadcast. I have tried plaster but not with very good success. I do not find that it is of any value on my land of late years. A good many years ago, we used to use plaster quite successfully, but of late years, it don't seem to do much good. I don't know why it is unless it is that the ground being full of manure, it don't need it.

MR. BROWN.—It has been recommended in our part of the State for rot in potatoes.

MR HOXIE. — Anybody interested in this matter of special fertilizers, can get some light through Prof. O. E. Atwater, who has been making some experiments at the Connecticut College in that line.

RASPBERRY AND BLACKBERRY CULTURE.

By C. H. HAMILTON, Fond du Lac County, Wis.

Third Paper.

Berries and the Farmer.—In a country where 40 to 50 bushels of corn is nothing great to boast of, it is not singular that a few beets, onions, cabbages, a little lettuce and sweet corn, all indifferently attended to, make up the kitchen garden of the average Western farmer. Yet his wife and children are as fond of fruits as any other man's family. You will see them, when the season for wild raspberries and blackberries comes, roaming the meadows and prairies in quest of the early fruit. Anybody can raise beans, but berries, which are quite as docile under culture, are regarded with distrust. By many, these provisions for family living are regarded as rather small business, unworthy of serious attention, or as a silly disposition to be over-nice in self-indulgence.

Fruit Raising Elevating.—The care and cultivation of small fruits is calculated to awaken the best qualities of the mind. The work is instructive, pure and elevating in every way. The enjoyment of these fruits upon the table is elevating. Their beauty and flavor awaken pleasing emotions. They are provided by a bountiful creator, to minister not only to our pleasure, but to our health as well. They come to us at that particular season of the year when the human system seems to require just what they are able to impart. They come just at the right time, and are made to suit the season. There should be, and may be, fruit in every home, not merely in scanty supply, but in abundance; yet there are thousands of families that go without. The trouble, small as it is, seems too much for them.

Preparation of the Soil.—In the culture of the raspberry and blackberry, there is no particular difference in the preparation of the soil. Do not be afraid to apply a liberal coating of manure, and give a thorough and deep plowing. Pulverize the soil with the harrow, for the labor bestowed in its preparation is not work thrown away.

Planting.—Plant your raspberries in rows, seven feet between the rows, the plants two feet apart in the row. Procure good, healthy plants and, in planting, the roots must be spread and placed as near as possible in the way in which they grew. Cover the crown of the plant two inches deep, pressing the earth firmly around it.

Care.—The main care which your plants will need the first season is thorough cultivation, and that is not only to be done thoroughly, but often, with the cultivator and the hoe. The growth will not be as strong the first year as the second. The second year, as well as succeeding years, not only thorough cultivation is necessary, but care, that your bushes do not grow too high. Pinch the tops off all canes as soon as 18 to 20 inches high. After that let the laterals grow at will. In spring cut laterals back to within 12 to 15 inches of main cane. Remove all the old wood as soon as the fruit is gathered, and burn the same.

Possibilities. — While other industries of the state have made great advancement, and a feeling of pride has sprung up among our farmers, as they have compared notes with each other and seen the possibilities which lie before them; while our agriculturists are rejoicing in the changes which have been made, and are likely to be made, along the line of farming, can not we as horticulturists see great possibilities yet to be obtained in our line?

Small Fruits Improved. — While there have been great changes in our modes of cultivation, what great changes have been wrought in our lists of small fruits of recent introduction! Now we have that large and mammoth black raspberry, the Gregg, the almost iron-clad Souhegan, which ripens its fruit early and abundantly, and that strong and vigorous grower, the Ohio, which has proved so profitable for evaporating. Along with these are valuable kinds of red raspberries, which, with the blacks, give us a succession of fruits.

Laying Down.—Blackberries can be raised successfully and profitably with a small amount of labor. Protection by laying them down (for protection is a great barrier in the minds of many) may easily be accomplished by removing the earth from the side to which you wish to bend down your plant, and a small amount of earth from the side and under the crown of the plant to make room for it to sink into; thus you are enabled to bend the roots and not the canes, and, by having the plants in rows 7 feet by 3 feet in the row, they are near enough together so that when laid down, one rests partly upon the other and is easily covered. Two men in a day and a half or three days will cover and protect one acre, or in other words, insure you a regular yearly crop of from 140 to 175 bushels of this delicious fruit.

Eternal Vigilance.—But in the care and cultivation of these fruits, as well as with the strawberry, the dewberry currants, gooseberries and grapes, all which add to the pleasure and profit of the small fruit grower, do not forget to exercise a vast amount of Thos. Jefferson's price of Liberty—eternal vigilance.

Discussion.

MR. J. M. SMITH.—Would you cut the Greggs down as low as you say?

MR. HAMILTON.— Yes, I would clip them down to a foot and a half; that will raise them to the height of four or six inches.

MR. TRUE.— How many plants would you advise an ordinary man to plant?

MR. HAMILTON.— I think fifty blackberries will keep the average Wisconsin family supplied.

MR. TRUE.— What is the average Wisconsin family?

MR. HAMILTON.— From four to thirteen.

MR. TRUE.—What kind of blackberries do you recommend?

MR. HAMILTON.—The kind that is cultivated in my section is the Ancient Briton, and for dry weather, for all purposes, there is no better variety. The Snyder is somewhat earlier and is planted quite extensively.

MR. HOXIE.— The Ancient Briton in some parts of the state is called the Wisconsin Blackberry; the two are identical.

THE FARMER'S FRUIT GARDEN.

By GEO. J. KELLOGG, Rock County, Wis.

Fourth Paper.

Farmers' Families Need Fruit.— Every one of the farmer's boys, girls, baby and hired man need, and health demands that they should have, two bushels of strawberries, one bushel of raspberries, one bushel of dewberries one bushel of currants and gooseberries, one bushel of blackberries, 120 lbs. of grapes, ten bushels of apples each and every year, and ten cans of preserved fruit for winter. How many of you supply your families with a pint apiece a week from June 1st to October 1st each and every year?

Didn't you, who have no strawberry beds, think and act as though one crate of fruit was all you could afford last year, and every year, for canning purposes? Now, which had you rather do, pay $25 for a generous supply of fruit or $25 to $50 in doctors' bills every year? The fruit tastes best to me.

A Fruit Contract.— Now, what are you going to do about it? I will enter into an agreement with you, and have your wife take one side of the contract. You are to furnish an acre, well manured, fitted and fenced, and $10 to the wife or children to buy plants, and you agree to pay them half price, say 5 cents a quart, for every quart of nice fruit they will raise for five years on that acre of ground. The family shall first be supplied with all they can use; after that you may sell the surplus, or let the wife have it for pin money. Let me suggest that this acre, to give the best results, run north and south, over a knoll 20x8 rods; that it be free from shade, well fenced from the chickens, manured with well rotted manure free from white grubs and weed seed, making the land able to produce 100 bushels of corn per acre; that it be well fitted by plowing and dragging as early in the spring as possible. If the ground is level, ridge it sufficient so that water will not stand on it in spring.

About Plants.—Now, a word about plants. If you want to make this a permanent garden, plant the west and north sides, six feet out from the fence, to grapes. For black, plant Moore's Early, Worden, Concord and Janesville; for red, Brighton and Delaware; for white, Lady and Niagara. These will cost from 5 to 25 cents each. Eight feet from the grapes (the rows running the long way of the garden, so that the horse may do most of the cultivating) plant a row of currants, gooseberries and pieplant.

Currants.—For currants, plant Red and White Dutch, White Grape, Victoria, Long-Bunched Holland and Fay's Prolific, any or all of these. Prices will be 3 to 5 cents each, except Fay which is higher; buy the best new variety.

Gooseberries. — Smith's, Downing, same price as currants, except this last novelty. I name this row of low-growing plants next the grapes, that the wagon may be driven over the row in drawing in manure.

Blackberries.—The next, third row, plant to blackberries — Snyder for early, Stone's Hardy and Briton for late. Plant three feet apart in the row. These plants can be had at 1 to 2 cents each; don't buy of traveling men, at exorbitant prices, poor dead, worthless stock. Send direct to the nursery, then you can go for the man who fools you.

Dewberries—The best is Lucretia, for all soils. Bartel' does well on clay. These can be bought from 1 to 5 cents each. Should be planted in the row.

Black Raspberries. — Tyler, Souhegan and Gregg, 1 to 2 cents each, for 5th row.

Red Raspberries. — Turner and Cuthbert, for 6th row, if you will keep down the suckers. If not, plant Shaffer's and Philadelphia. These reds cost ½c to 2 cents each.

I have mentioned prices of these plants that you may not be imposed upon, either by traveling tramps, or those miserable nursery-men. Prices of new varieties get cheaper every year.

Keep Up Fertility.— Now, we have in the varieties of fruit that will remain on the same ground as long as you will probably care for them. Don't forget to keep up the fertility, as these plants yield you fruit. Keep them clean and well manured; all of them will bear some the year after planting; some will not come to their best until four years old.

Culture and Treatment — Grapes. —I can give but few suggestions in the little time allotted me as to culture and treatment. Set the grape roots eight feet apart, and six to ten inches deep. Prune, or rub off, all the laterals and throw the growth into one cane. The first year, in November, cut it off eighteen inches above the ground and bend it up or. down the row, and cover with earth. The following years train to one or more canes with spurs, and in November cut off three-fourths of all the new wood, lay down and cover. After the fruit is set, if you want to protect from birds, insects, mildew and rot, slip a small paper bag over the cluster and pin it about the stem.

Currants and Goosberries.— The currants and goosberries must be looked after early in the season, and when the currant worms first appear dust the leaves with fresh and pure white hellebore.

Blackberries.— Set the plants three feet apart; nip off the new shoots at three feet high, in June. In November loosen the earth about the plant and bend it in the root. Lay it over, up or down the row, always the same way, and cover with earth. In the spring remove the covering and get the earth out of the row or you will ridge the ground. Straighten up the plants, press the earth firmly about them, tie to a stake, or run one wire over the row 2½ feet up, and tie to that.

Dewberries.— The dewberries need covering in November with marsh hay. Lift them above it in the spring and leave the hay as a mulch. Be sure that there is no grass, clover or weed seed in any mulch you use in the fruit garden. Mulch everything liberally.

Black Raspberries.—The black raspberries can be easily covered, if you incline them all one way while they are growing. While they usually bear without, they will always do better with protection. Nip the new canes at three feet to form laterals and harden up the wood.

Red Raspberries—Are easily covered, except Shaffer's, which should be trained to one side like the black. Those red that sucker must not be permitted to grow too thick. Treat the young plants as weeds. Plant all these rows six to eight feet apart.

Strawberries.—Now, we come to the strawberry rows, and it is best to follow corn or potatoes with strawberry planting, if possible, thereby avoiding the white grub.

You want a square rod of ground for each member of the family, and about as many more for visitors and friends. If four rows across the garden will be enough, plant two of perfect flowering kinds and two of pistillates. Between two rows of one kind you will get pure plants for next spring's planting; so set 50 plants of a kind, 25 in each row side by side.

Varieties.—I will name for the perfect flowering kinds, Jessie, May King, Miner, Parry, Wilson and Mt. Vernon. Pistillates, Bubach, Crescent, Manchester, Jewel and Windsor Chief. From these you may select, or plant them all. You can have 25 of a kind at hundred rates and have early and late, large and small. If I could have but two they would be Jessie and Bubach; next May King and Crescent, next Wilson and Manchester. The first two are worth 4c., apiece; the others 1c., each.

Keep the Garden Clean.—Plant best kinds, and be sure you get plants pure and unmixed, and keep them so. Set a new bed every year; if the old bed does not get too grassy, leave it for 2d and 3d crops, but for the 1st., year after planted hoe that strawberry bed every Monday morning, just as sure as the washing is done. Keep the whole garden clean by frequent cultivating and hoeing. Cultivate shallow, but often; this is very essential in time of drouth, and after every rain.

Plant your strawberries 4 ft. by 1, 2 or 3 ft., as you choose, in the row, for matted rows. In hoeing train them up and down the rows. Keep picking off all blossoms the first year, giving the strength to the plants.

Large Berries—Mulching.—If you want fancy berries, a good many of which will fill a tea cup, plant two feet apart each way and keep off the runners. Don't hoe or cultivate about the strawberry more than a half-inch deep. In November if the matted rows are too thick, take a knife and cut out all the small and puny plants before freezing up. As soon as the ground is frozen one inch deep, cover the entire bed and paths with marsh hay, or cut corn stalks just so you can't see the foliage; don't put on too much. In spring leave the mulch all on, opening up if plants don't get through. This mulch makes a clean bed for clean fruit and protects in time of drouth. Hand weed what is necessary before fruiting.

Do not plant pistillate varieties alone. While set beside perfect flowering kinds, they are the most productive of any. Every strawberry catalogue should be marked so that you may know which are pistillate and which are not.

Successful Returns.—In summing up this question of small fruit, I will name some instances of successful returns with good culture:

C. Rouse, of Iowa, 1886, with Crescent, Wilson, Manchester and Sharpless, from 16 rows, 29 rods long, picked 3030 qts., which is 26½ qts., per square rod. This was a dry season.

Thos. E. Root, of Illinois, 1888, 1½ acres of Crescent and Miner, set 3½ ft., picked 2,500 qts., 31¼ per square rod.

Jewell strawberry, in 1885, gave 80 qts. per square rod, Bubach, in 1885, gave to one boy, in two hours' picking, before breakfast, 72 qts. One hundred Crescent plants, the following year, yielded 500 qts. of fruit, while one picker, at Minneapolis, picked 239 qts. of Countess in one day.

B. S. Hoxie, of Evansville, in 1886, had 112 qts. from a patch 16x24 feet, 37½ qts. per square rod.

W. T. Scott, Boscobel, in 1885, from 90 rods took 126 bu., 1⅜ bu. per rod. These were Crescent and Wilson.

Levi Chase, Madison, Wis., grew over 4 bu. per square rod of Wilson, Crescent and Winder Chief.

J. C. Jenks, Janesville, when Wilson did better than now, grew 4½ bu. on 1 square rod, and Mr. J. F. Morse, the same year, grew 5 bu. per rod.

Mr. Loudon reports Jessie in hills as yielding 600 bu. per acre.

Now, there is no need of any one who has a spare rod of ground doing without strawberries. The returns of black raspberries are from 3 to 8 qts. per hill in favorable seasons, and blackberries yield equally as well, while red raspberries yield about the same to the square rod, and grapes from 10 to 20 lbs. per vine, each year, and many bunches of grapes will fill a market basket.

A Good Mixture.—Mix brains, common sense, muscle and manure in the right proportion, and you can raise anything the soil will produce, and in quantities according to the mixture you apply. Do not expect "grapes of thorns or figs of thistles," although I have seen splendid Jessies where the thistles prevented the picking of the fruit.

Requisites for Success.—Good soil, well drained, rich in composts, free from weeds and white grubs, good kinds, true to name, well planted, well cultivated, properly protected, in ordinary seasons will pay a wonderful per cent. on all the investment, and you can have strawberries that you can cut with a carving knife. Of course you must look out for the leaf roller, crown borer, thrip, white grub, and a host of other pests. Mow the strawberry beds right after fruiting, and to destroy these leaf-eating insects, burn when there is a brisk wind, for in a dry season it may injure the beds.

The leaf-eating insects of any plant or tree may be easily destroyed by white hellebore, London purple or Paris green, when the fruit is not maturing. We can't have anything without some sweat, and sometimes a good deal. Every plant, shrub, grain, fruit, vegetable, grass, tree in the forest, and fruit tree, from the time of the garden of Eden till now, has its peculiar enemy, and man is not an exception, for woman is after him and the devil is after them both.

Apple Growing in Wisconsin.

Why it is Unsuccessful.

1. We plant on low, black soil, undrained or unridged, or on the south and southeast side hills. We should plant on the top of clay timber ridges, north and northeast side hills.

2. We have been planting for forty years the tender or half-hardy sorts, and too large trees.

3. We neglect to prune the tree to one central trunk, with only side branches at nearly right angles 36 inches apart.

4. We do not shade the bodies from the day of planting to protect from the borer, and the heat of the sun, summer and winter.

5. We too often neglect to fence, and often the cattle do the pruning.

6. We often grow them too fast and too late in the season, especially for the first six or eight years. Do not stimulate to growth after the 1st of July.

7. We starve them to death after they come to bearing.

8. We do not protect from our insect enemies by spreading with poison after blossoming in spring and early summer.

9. We often let our trees overbear, and thereby injure the vitality of the tree, and if this is followed by a hard winter the tree is injured and often killed.

10. Because of hard winters—more because the foregoing precautions have been neglected than the necessary injury by cold.

In order that the severity of the winters may be understood, I herewith append a synopsis of the past fourteen winters, with a more extended report of this winter just closing:

The record below was taken on the north side of a hard maple tree with a Farenheit mercury thermometer. Only such days are given as went to zero and below, including also November and December, 1887:

November, 1887.

November 28th, 6 below zero.

December, 1887.

December 22d, zero; 24th, zero; 28th, 12 below; 29th, 16 below; 30th, 19 below. Five days at zero and below aggregated 47 degrees.

January, 1888.

January 2d, 8 below; 3d, 15 below; 9th, 2 below; 10th, 10 below; 11th, 18 below; 12th, 12 below; 13th, 12 below; 14th, 22 below; 15th, 27 below; 16th, 30 below; 17th, 10 below; 18th, 20 below; 19th, 10 below; 20th, 15 below; 21st, 30 below; 22d, 17 below; 24th, 9 below; 26th, 5 below; 28th, 10 below. Nineteen days at zero and below aggregrated 282 degrees.

February, 1888.

February 6th, 7 below; 7th, zero; 8th, 21 below; 9th, 27 below; 10th, 21 below. 11th, 18 below; 15th, 10 below; 16th, zero, 26th, 7 below; 27th, 12 below; 28th, zero; Eleven days aggregated 123 degrees.*

To the first of March for the past winter, thirty-six days at zero and below aggregrated 468 degrees. We hope we have passed most of the zero weather for this winter.

The following figures will give the comparison for the past thirteen winters:

Winter of 1874-5 gave 47 days below, aggregating 742 degrees.

Winter of 1875-6 gave 14 days below, aggregating 120 degrees.

Winter of 1876-7 gave 40 days below, aggregating 418 degrees.

Winter of 1877-8 gave 4 days below, aggregating 22 degrees.

Winter of 1878-9 gave 38 days below, aggregating 386 degrees.

Winter of 1879-80 gave 15 days below, aggregating 106 degrees.

Winter of 1880-1 gave 58 days below, aggregating 606 degrees.

Winter of 1881-2 gave 11 days below, aggregating 61 degrees.

Winter of 1882-3 gave 47 days below, aggregating 597 degrees.

Winter of 1883-4 gave 33 days below, aggregating 371 degrees.

Winter of 1884-5 gave 52 days below, aggregating 669 degrees.

Winter of 1885-6 gave 27 days below, aggregating 278 degrees.

Winter of 1886-7 gave 38 days below, aggregating 449 degrees.

The coldest month in thirty-two years was February, 1875. Twenty days below zero aggregated 324 degrees. The coldest days during the last fourteen winters were as follows:

Winter of 1874-5. January 9, 30 below; 1875-6, February 2, 17 below; 1876-7, January 25, 30 below; 1877-8, January 7, 15 below; 1878-9, January 2, 33 below; 1879-80, December 18, 26 below; 1880-81, January 10, 37 below; 1881-2, January 23, 14 below; 1882-3, January 21, 36 below; 1883-4 January 5 and 6, 35 below; 1884-5, January 22 and 23, 30 below; 1885-6, January 23 and February 3, 28 below; 1886-7, January 7, 37 below; 1887-8, January 16 and 21, 30 below.

Discussion.

MR. WEST.—What pruning do you give your currant bushes?

MR. KELLOGG.—Take out the old wood after three years old; renew the bush continually from year to year. The black currant might need nipping on the shoots after a season's growth.

MR. J. M. SMITH.—How does Fay's Prolific do?

MR. KELLOGG.— It is paying very well. It is a large, late variety, similar to the old cherry currant in size, but much better in yield. I would trim out the old wood from blackberries in the fall; if I were trimming for shortening in for fruit, I would trim off any time in June after the growth has made one foot.

---

*March, 1888, has given but one day below zero, that was 22d, 6 below, making the average 476 up to March 27.

MR. SMITH.— Why do you recommend so many kinds of strawberries?

MR. KELLOGG. — There are a great many different tastes, and you can have a dozen varieties of strawberries at the same price you can have one or two kinds.

QUESTION. — Have you for sale the Janesville grape?

MR. KELLOGG.—Yes, and it is good for everything but to eat.

MR. SEYMOUR.—It seems to be ripe the earliest and the latest of any grape produced, and it may be good to eat under the impression that it is a new grape imported from France, but I think it is good for nothing except as a windbreak.

QUESTION.— Isn't it good for preserving?

MR. KELLOGG.— The best way to preserve grapes is to sit up nights and eat them.

QUESTION.— I would like a remedy for the currant borer?

MR. KELLOGG.— The best remedy is the knife and the fire; cut out the old wood and burn it.

POTATO CULTURE.

By KENNEDY SCOTT, Columbia County, Wis.

Fifth Paper.

Kind of Soil to Select.—The kind of soil to select is a very essential element in the success of potato culture as well as in any other crop, and I think more essential in this than in most others. While in nearly all other crops, good land in good condition will produce an average crop, it is not so with potatoes. It is necessary to have what is generally styled with us *sandy loam*, and that in good condition. After it has been seeded down to clover, give it a good coat of barn-yard manure, about 25 loads to the acre, plow early in the fall, and in the spring thoroughly cultivate till it is well pulverized to the depth of four or five inches, and well smooth with a smoothing harrow.

Marking the Ground.—Now it is ready to be marked, which I do one way with an ordinary marker making four marks, three feet apart. To mark the other way we take an ordinary sulky corn plow; taking off one foot from each side, fix the others stationary with rod holding them just three feet apart, furrowing across the marks to the depth of at least four inches. I have obtained best results from planting that depth, using an ordinary tracer to assist in getting rows straight and of equal width. The planting to this depth is necessary for two reasons—it puts the seed deep enough into the ground so that we may get the full benefit of thorough dragging before the young plants make their appearance above ground, and again just as they are out of the ground. This should be done with a Scobic harrow, or some other slanting tooth harrow. I have never found one that does as well as this. Second, I find if the seed is not put into the ground from four to five inches deep that we have a great many potatoes that grow out of the ground and become sunburned and hence good for nothing but feed or seed.

Preparing the Seed.—Selecting and preparing the seed should be done with a great deal of care, as upon this, in connection with planting, to a certain extent, depends the difference between a good paying crop and an average or poor crop; if the seed fails in 1-15 of this it will reduce the yield at least 12 bushels per acre. On an average crop this is too much to lose. The seed should be taken from medium sized, smooth potatoes; first cut the seed end off and throw away, then cutting the pieces so there will be two eyes to the piece. This should be done on wet days, or if extra help has to be hired, it is best to hire women to do this, as there will be quite a saving in expense, and the work will be as well done. Seed should be cut a few days before planting on account of becoming damaged from being kept in a pile. If kept any length of time should be put in bushel boxes.

The planting should be done by having a boy drop potatoes by going across the furrows, putting one seed in a place, and a man follow up and cover with a hoe. As to time of planting, it is best to plant as early as we can immediately after putting in the small grain, as it gives the tubers the best part of the growing season for development. While some think late planting makes less trouble to fight the potato bugs, give me the early planting.

Cultivation.—The cultivation should begin just before the plants make their appearance, with a slanting tooth harrow, as stated above, and do not be afraid to give the ground several thorough draggings at different times till the potatoes are all up. Then put a fine tooth single horse cultivator at work, and you need not be afraid of overdoing this part of the work, for the ground should be stirred immediately after every rain to prevent the starting of weeds; at least it should be cultivated twice each way with this tool, as by this means you can ripen the crop from 5 to 10 days earlier. The hilling should be done, just as the vines are in full bud to blossom, with a single shovel plow with wings on, going both ways.

Fighting the Potato Bug.—The most important thing in this latitude is the fighting of the potato bug, which we do with Paris green mixed with land plaster. Take a good box, about the size of a boot and shoe box, or a little deeper, cut and fit pieces of inch boards about an inch square in the inside of the box every ten inches, making them reach across the same, and fasten by driving a nail from the outside into each end (not putting cross pieces directly under each other). Then fit a cover on with hinges, and fasten with clasps, to keep shut. Tack narrow pieces of cloth on edge of box to keep plaster from sifting out. Find center and put hole through shortest way on which to revolve the box, by putting crowbar or any iron bar for axle. Nail two crotched sticks to pieces of timber 8 by 8 inches, making them of sufficient height to let the box revolve when hung on bar in these crotches. Then put half the plaster that can be handled in box, putting Paris green in at the rate of 12 to 14 ounces to the hundred weight of plaster. For example: If your box will handle 100 lbs. (and this is about the right size), put 50 lbs. plaster and spread over this 6 or 7 oz. Paris green; then add 50 lbs. more plaster and 6 or 7 oz. green. Shut box cover tight, revolve about ten times, and your compound is ready for use, well mixed.

As everyone does not have scales, we usually have a small can that will hold a pound of green, as a measure, and as our plaster comes in bags of 200 lbs., it is not much trouble to get along. In putting it on the potato vines, we carry it in pails and scatter over the land. I have used a small tin can with bottom punched full of small holes, but think it does not pay, as I find when I use plaster most bountifully, have always had the best crop. Two men will mix and put on 500 lbs. in a day. This should cover ordinarily about 2 or 3 acres according to the condition or growth of vine and amount of bugs. The mixture should be applied when the young bugs are nicely hatched out. After waiting a few days it is generally necessary to go over the patch and put some on the hills where the bugs have hatched; this will have to be governed by circumstances. But we are satisfied that the increase of crop, when plaster is used, will more than doubly pay for same, and time of putting it on.

Harvesting.—In harvesting, we dig with six-tined forks. We go over the ground and first pick up the merchantable potatoes and put them in boxes made of lath with board ends; inside measurement 12 inches deep, 16¼ inches long, and 14 inches wide, which hold an even full bushel, haul them to a pit, or, better still, to a building and store till time to sell. Then we pick up the small ones in the same way and take to the cellar, and, during stormy weather, and in the winter, we look them over, getting out those fit for house use and seed. The very small ones we keep for feed for stock in the fall and winter; I think they are worth 15 cents per bushel, with a grain ration.

Cost of Cultivation.—The cost of cultivation and marketing I find as follows:

	Dr.
To rent of one acre	$4 00
To prepairing and marking	2 00
To planting	1 50
To puting on plaster	50
To plaster, 250 lbs. at 45 cts	1 12
To Paris green, 2 lbs. at 25 cts.	50
To dragging and cultivating	1 75
To harvesting, 100 bu. at 5¼ cts	5 25
To 5 bu. seed and cutting same	1 75
To marketing 100 bu., 1½ miles	2 50
Total	$21 57
	Cr.
To 100 bu. at 38 cts	$38 00
To 50 bu. at 20 cts	10 00
To 20 bu. small at 10 cts	2 00
Total	$50 00
Less expense	21 57
Profit	$28 43

This 170 bushels to the acre is not over an average crop, nor is the price, 38 cts., above the average for a series of years, as I have aimed to give facts, not any fancy drawn theories. While this year, in the vicinity of my home, some crops, or at least one, were sold that brought $90 per acre as gross receipts, yet this was the best crop, I think, in the county. Others brought from $20 to $60, the extra price making up the deficiency in yield.

Varieties to Raise.—As to kinds to raise, select some single standard variety and raise this; it will give the best results, as most farmers have not the conveniences to keep separate several varieties; leave the experimenting to the Experiment Station (which is doing grand work for the farmer of this state), or to seed-men, who are making a business of this work. The farmer who raises but one variety can always sell to better advantage, especially if he should have a car-load. If a less amount, if it be a standard variety, the buyer can afford to pay more, for he can go out and buy a car-load of that variety, as straight car-loads sell to better advantage in the general market. Again, the farmer who raises enough to have a car-load to sell, can bring the local buyer to pay what the market will afford, or ship himself. This year I know a single instance where a man was offered 25 cents, and plenty was being purchased at that price, while the party who had a car-load, shipped to a reliable commission merchant in Chicago and *net returns* gave him 6½ cents. But in order to get this fancy price, you must select or assort closely, not being afraid to take out the small ones, as the consumers in the cities will not pay for them. Then make a car of second sortings and ship these, and they will sell to good advantage.

The Industry Growing.—I have spent some time to ascertain if this industry is on the increase. For this purpose I have consulted the depot agents at the following stations, and find for 1882 and 1887 the number of car-loads to be as follows:

	1882.	1887.
Wyocena	..	7
Doyelstown	10	20
Rio	12	22
Fall River	51	[illegible]
Total car-loads	73	101

Estimating a car-load at 400 bushels, we have 40,400 bushels, and estimating the average price last fall at 60 cents, we find the value of potatoes sold as above to be $24,240. Has there been any other same number of acres of land, with an equal amount of farm labor, that have produced anywhere near this amount for one crop?

EXPERIENCE IN POTATO RAISING.

By MATT ANDERSON, Dane County, Wis.

Sixth Paper.

No Rule Certain.—Although I have been growing potatoes in a small way for 40 years, I must confess that I cannot give any certain rule or process whereby I can be certain of raising a good crop every year. I have experimented in various ways of planting—in planting large potatoes whole, in cutting in small and large pieces.

An Experiment in Ohio.—About 40 years ago, in Ohio, I planted ¼ of an acre in potatoes. The lot was 220 feet long and 50 feet wide. Through the center of that lot, lengthwise, I planted one row of large, round potatoes, whole; on each side of that row I planted the seed end of large potatoes, the potatoes being cut in two; did not plant the stem end. The rest of the lot was planted with the same variety of potatoes, cut to two or three eyes in a piece. The row planted with whole potatoes produced one-fourth more and larger potatoes than any row planted with cuttings of two or three eyes, and one-eight more than the rows that were planted with the whole of the seed end. This lot of less than ¼ acre produced 73 bushels.

Planting Whole.—Since that time I have frequently planted large and medium sized potatoes whole, with good results. I would not plant long potatoes whole, as they would grow too many tops; but round potatoes grow tops only from the seed end when planted whole. In planting large potatoes whole, I plant from two to two and one-half feet apart in the rows, while in planting small seed, I plant from 12 to 18 inches apart, rows three to three and one-half feet apart. Early potatoes that grow small tops can be planted closer than varieties that grow large tops.

To Grow a Good Crop.—To grow a good crop of potatoes we must have good land, good seed, and good culture. I have raised a good crop by planting in a field that was an Alsike clover pasture for two years. The seed was dropped in the furrow close to the land side, every third furrow; the furrows, 13 inches wide, I plowed about four inches deep. About the time the potatoes began to come up, I harrowed thoroughly, and when one foot high, cultivated with a three-shoveled iron cultivator, then ridged up high with a horse-hoe with wings on. That year my neighbors' potatoes that had flat culture rotted badly. It was a wet season; my potatoes were saved by the deep furrow between the rows, thus preventing the water from sinking around them.

Method of Planting.—My usual way of planting potatoes is to plant on land that had been in corn the previous year, on clover sod manured before plowing for corn. I plow the stalks under about seven inches deep. I have a three-row corn marker made of 2 by 8 inch plank, runners three feet long sharpened on the underside. A man rides on it, and if done soon after plowing, the marks will be deep enough to drop the potatoes in; I cover with a three-plank slicker, the man riding on it and going over the ground both ways. Sometimes I use a smoothing harrow to cover with.

Cultivating.—I do no more work until the tops begin to appear; then harrow so as to kill all weeds, and cultivate with sulky cultivator when 8, 10 or 12 inches high, using horse hoe with wings on to finish. I have no time to use a hand hoe or pull weeds. Foxtail grew last year after we finished cultivating, yet I had a good crop of potatoes for so dry a year.

Fitting the Land.—My land is rolling prairie; good corn land, with a porous clay subsoil, of a brown color. Last fall I began to plow a cornstalk field for potatoes. The land had been in Alsike clover for two years, then manured and planted in corn last spring. This field I plowed with a three horse new deal plow, about 7 or 8 inches deep, and followed after with a subsoil plow, loosening the ground in the bottom of the furrow from four to five inches deep, as I believe in planting potatoes shallow. I expect to have plenty of loose soil under the potatoes, which I think will be of benefit whether the season is wet or dry.

Varieties. — For information on this subject, I refer you to Professor Henry's late bulletin. You will find more truthful information in it in regard to varieties than you will in all the advertising catalogues. If a man has any respect for his character for truth and veracity, he had better not recommend any one variety as being better than all others. Yet I am in favor of experimenting with new kinds and of changing to the best. It is better to lose a few dollars in obtaining new seed than to plant varieties that are run out. I sent five varieties of potatoes to my present farm from Ohio (28 years ago) before I moved to it, and was ridiculed by those then living on it. Among those varieties was the Peachblow, which proved one of if not the very best potatoes in its day. A variety in a dry season and on good potato soil may be mealy, and quality first-rate. In a wet season or on wet land, or if not ripe, it may be unfit for table use. I believe in planting early. I have early Ohios, Early Harvest, May-Flower and Clark's No. 1, which I think are as good as any I have for early. I have bought four new varieties this year, and intend to get such as are recommended by reliable growers.

Digging and Marketing.—I dig with a common-sense digger; I am in hope of getting something better, as the objectionable part of the business is the picking. I sort in the field, putting small ones in bags and the large ones in wagons. If there is a market near home, sell at home; if not, ship to the best market. It costs as much to haul potatoes on a wagon 15 miles, as it does on the cars 150 miles. I have seen a statement that it requires about 10,000 bushels of potatoes a day to supply the Chicago market. The demand for potatoes, within the last few years, has increased more than for any other crop the farmers produce. Therefore we may expect a market every year for an average crop of potatoes. If each family of five persons in the United States consumed four quarts of potatoes each day, it would require 480,000,000 bushels a year. This year hundreds of thousands of bushels of potatoes have been imported to this country. You can see foreign varieties of potatoes quoted in the Chicago market. Canada, Nova Scotia and New Brunswick, can, and would supply the Eastern States with potatoes, if it were not for the duty of 15 cents per bushel.

Killing Potato Bugs.—I want to say something in regard to killing potato bugs, as I have a different plan for killing them from my friend from Rio. I have a pair of trucks, such as we used to use under threshing machine powers. I have two kerosene barrels that hold fifty gallons each. I have taken two pieces of inch hose, one seven feet and one six feet, and secured each of them into the bottom or the side of the barrel, or rather fastened them to an iron spigot in the barrel. At the other end of the hose, I have adjusted the rose of a common sprinkling can. I fill those barrels with water, and I sent to New York for London purple which costs ten cents a pound; I put that into the water, and one man sits behind and another in front, straddling a barrel, and they can sprinkle two rows of potatoes as fast as your horse can walk. I find this better than the Paris green, and it won't blow away or injure the plants. Arsenic is about the cheapest thing, but it requires a great deal of care.

Discussion.

MRS. BARLOW.—We have what I call an improvement on the methods suggested by both gentlemen, for destroying potato bugs. We have an old cart attachment, such as is used for sprinkling the streets, and one man and a team can sprinkle four to six rows at a time, and it works first-class.

MR. ANDERSON.—I should think you would sprinkle more on the ground than on the potatoes.

THE CHAIRMAN.—That could be regulated by perforating in rows.

MR. JACOBS.—I would like to know if there is any remedy for the scabbiness of potatoes.

PROF. CHAMBERLAIN.—I don't think we have had any real light in regard to that. We can tell the nature of the scab, but what brings it we don't know. Sandy land produces it much less frequently than a richer clayey land. Furthermore, fresh manure, not properly mixed through the soil, produces scabbiness, but I don't know of any way to relieve potatoes from scabbiness in a wet season.

MR. TOOLE.—What is the proper mixture for Paris Green?

PROF. CHAMBERLAIN.—Fourteen ounces of Paris Green to one hundred pounds of land plaster, putting fifty pounds of land plaster in a box, then spreading over it seven ounces of Paris Green, then do the same thing over again.

MR. LOCKWOOD.—I made an experiment in fertilizing potatoes some years ago. I put on so many rows 'and plow under green manure, then on so many more rows I put manure scraped up the summer before. Then on so many more, I put rotted sawdust. My idea was to find out a little about this scab. I found where the green manure had been put on the scab was very bad. Where the ground had been manured the year before, the scab was less, but bad, but where the rotted sawdust was put on, the potatoes were just as clean as could be, not a particle of scab. If we will make such experiments, I think we will find them valuable.

MR. PARKES.—Why do you plant in rows instead of hills?

MR. ANDERSON.—I think I can raise more potatoes to the acre. I think it is much quicker done and digging with the common sense digger, I think you can dig faster. I don't give my potatoes as much work as some people; I don't think it is necessary if you do it at the right time. I commence just as soon as I can. Last year I planted about the 12th of April and planted about twenty acres before I quit, and I certainly had the best crop of potatoes in my section—something over one hundred bushels to the acre, but I did not give them any extra cultivation whatever. In dropping the potatoes in rows, my men carry a sack around their neck, and their instructions are to drop a piece of potato and put their foot on it. Then I put on a slicker, which passes both ways and covers them very quickly, and don't think I could cover them that way if they were planted in hills. I ridge them up. I have tried flat culture, but have not done as well as on shallow culture.

MR. LOUIS.—I have followed Mr. Terry's mode of planting in five or six inches on sandy land, and I raised one hundred and forty-seven bushels to the acre by flat culture. It adds to the cultivation, because we can drag them longer and keep them cleaner.

MR. ANDERSON.—In a dry season, I think flat culture will do, in a wet season, I think they will rot.

MR. MILLS.—I would like to ask Mr. Scott why he cut off the seed end of his potato and threw it away?

MR. SCOTT.—The reason is that there are too many eyes in that part of the potato, and hence, will give too many stalks, which will throw out roots and bring forth potatoes making many smaller ones.

MR. MILLS.—A good many years ago, one year potatoes were very scarce, and we had to buy them and pay from $1.75 to $2 a bushel. I cut off all the seed ends of the potatoes that I laid in for the winter, and we ate the rest of these. In the spring I planted the seed ends, and I had the largest field of the most even potatoes that I ever raised in my life.

THE CHAIRMAN.—I think I can tell a bigger story than that. A few years ago, when potatoes were very scarce in our county, the potato parings around the hotel were picked up, and from them we raised potatoes that, I think, weighed four pounds, some of them.

MR. URQUHART.—Speaking about potato scab, I have been for several years, troubled very badly with it. My land is rather a heavy clay loam. A year ago last spring, after the ground was well prepared, I happened to have two bushels of air-slacked lime. I sprinkled that pretty freely over the ground and raised the best potatoes that I have for many years. Of course, I don't know whether the lime had anything to do with it.

MR. KELLOGG.—I would like to know if leached or unleached ashes will help potatoes, and if so, how much?

MR. J. M. SMITH.—If I used unleached ashes, I would put it on at the rate of from fifty to seventy-five bushels to the acre, and about double that amount where we have leached ashes; there isn't much danger of putting on too much. In regard to cutting off the seed ends and throwing them away, last spring I saved a bushel of the seed ends and planted them by themselves, right in the middle of the piece of two or three acres that I was planting, and I found that when we came to dig them, the yield was just about the same, and the potatoes about the same size. But those coming from the seed ends were nearly a week earlier than the others.

MR. LOCKWOOD.—Having tried the experiment for seven years, I find the seed end invariably produces an earlier potato.

GRAIN RAISING.

By GEO. C. HILL, Fond du Lac County, Wis.

Seventh Paper.

A Sentiment Against It.—One is almost at a loss to know why information is called for on this subject, when it is well known that the growing sentiment of our best farmers, and indeed of the whole State, is away from this industry. But I have thought that in the race for the front, to which our Farmers' Institutes are so swiftly rolling us, our sagacious driver, the Superintendent, is becoming a little anxious about his impetuous leaders, and is tightening up the breeching and turning on the brakes. So what we have to say may be taken as hold-backs. And if our friends of the silo and dairy find it convenient to take a short nap, or suddenly remember that they have an engagement out, they will be perfectly excusable, even if we are left to raise grain to empty seats.

Comparative Values.—We still find a large portion of our farmers who are in the hold-back line. They cannot get over the idea of selling their farms by the bushel. But if wealth will not tempt them to a better plan, the want of it will soon drive them to it, or they will be driven from the field. A few figures will show the comparative value of the grain product with that of live stock, in Wisconsin, for the year 1885: The value of the wheat product was, $13,928,000; corn, $12,576,000; oats, $11,008,000; barley, $5,255,000; rye, 1,034.00; buckwheat, $230,000. Total value of grain $44,631,400. The value of the butter product was $5,850,402; cheese, $2,984,813. The value of beef product was $5,981,488; hogs, $10,323,776; mutton, $793,018; wool, $1,337,088. Total value from live stock exclusive of the horse, $27,270,585. Excess of value of grain product over that from live stock, $16,760,415.

Of all the agricultural products of the State in 1885, the wheat crop was the most valuable, worth $13,928,000. If for every twenty bushels of wheat, there grew one ton of straw, there were 1,000,000 tons, worth $2.50 per ton, making a total value of $16,428,000.

Average Yield Per Acre. — The average yield per acre reported for the United States was 10.5 bushels. The average for Wisconsin the same year was 17.2 bushels. This shows a high comparative average.

Objection to Wheat Growing.— The great objection urged against wheat growing is, that it is a crop which is sold off the farm, nothing but the straw being retained. A crop of 17 bushels of wheat takes from the acre of soil 18⅓ lbs. nitrogen, 8 lbs. phosphoric acid, and 5⅓ lbs. potash, valuable substances worth $3.75. A ton of wheat straw takes 9⅓ lbs., nitrogen, 5¼ lbs., phosphoric acid and 11⅓ lbs., potash, worth $2.50. But the wheat straw is a useful product on the farm, and to have a supply of it, is one of two reasons why some of us continue to grow wheat; with its use stock can be kept clean and comfortable, besides being useful as an absorbent, Grain straw is also utilized by many of our farmers for feeding purposes. If properly fed in connection with other feeds, it is said to be worth 70 per cent. of that of best hay. It has become of so much importance, that it is saved and stacked with more care than formerly. It used to be the plan to fill our barns with harvested grain. At threshing time, the straw was run out and piled in the barnyard. A better way is to stack the grain near the barn and mow straw in the barn, direct from the machine.

Winter Wheat.—I believe that on many farms, winter wheat can be grown with better results than spring wheat. I commenced to grow winter wheat, of the Fultz variety, in 1883, and have had five successive crops, with an average yield of 30 bushels. The yield for 1885 was 47 bushels. That for 1887 was 25 bushels. I believe almost every farm has some land on which winter wheat can be safely grown. A gentle slope to the east, free from knolls or ridges where the snow will blow away, or hollows where the water will settle, is a good location. If with these conditions, the field is skirted with timber on the west, it is still better.

Sow Clean Seed.—If the soil is properly prepared before seeding, it is best to sow the seed broadcast. This method prevails among many who have had experience in the use of both the drill and seeder. For spring wheat we prefer the hard varieties of Fife. The Saskatchewan has given good satisfaction. Whatever variety is grown, clean seed should be planted. Cockle and chess are more than worthless. If a man sows wheat he will reap wheat, twenty fold. If he sows chess he will reap chess, a hundred fold. This fact has been proved to me, and I am prepared to prove it to others. But I am sure this intelligent company of old farmers will not question the statement; yet, I find this old theory of wheat producing chess about as hard to eradicate, as it is to get all the chess out of the seed wheat.

Seeding With Clover and Grass.— The second reason for growing wheat is, that it is one of the best crops with which to seed with clover and grass. If with winter wheat, the seed is sown as early in the spring as the fact of the living condition of the wheat plant is ascertained. After a light snow in April is a good time. The wheat crop will mature in July, after which the clover and grass will have a long season to possess themselves of the soil, while the stiff stubble makes a good protection during the first winter.

System of Rotation.—In my system of rotation the oat crop follows the grass, meadow or pasture. The sod is turned over in the fall, and in the spring can be worked up in fine condition. Our average yield of oats, on sod, has been from 50 to 60 bu., going as low as 25 bu. in a season of drouth, and as high as 70 bu. in favorable seasons. The White Schonen is found to be one of the best varieties. In Bulletin No. 13, Wisconsin Experiment Station, is a table giving the yield of 27 varieties of oats for a number of years past, at the Station. The average yield of all the varieties was 50 bu. That of the White Schonen was 50¾ bu., being exceeded by only one variety, the White Australian yielding 60½ bu. The report says: "No variety has yet been found superior to the White Schonen in productiveness, strength of straw and thinness of hull."

Oat Crop For 1885.—The oat crop of Wisconsin for 1885, was 43,000,000 bu., valued at $11,008,000; with this crop were produced about 1,000,000 tons of straw, worth $3.00 per ton. The average yield was 34½ bu. The average for the United States, for the same year, was 27½ bu. As a State we should not be satisfied with our low average. We should aim at nothing short of 50 bu. It is a fact, however, that a good deal of low, wet land, not in condition for any crop, is annually sowed with oats, often as late as the middle of May. The crop is a little rusty straw, and a few bushels of oat hulls. To grow a good crop of heavy oats, it is necessary that the seed be planted as early in the spring as the season will permit, and on land that is in condition to grow other good crops. As to the wet land let it "go to grass," until it can be got into condition for early planting.

Feeding Value of Oats.—A crop of oats draws from the soil fully as heavy as a crop of wheat, but as both grain and straw are consumed on the farm, it is a good crop to grow. Still it is a question, whether we can afford to feed so many oats on the farm. A ton of oats is worth in the market, $20. We will suppose this to be its feeding value. With the $20, could be purchased 2500 lbs. of bran or middlings, which, according to a table in Hoard's Dairyman for March 2nd., is worth $27 to feed, while the fertilizing value of the non-utilized portion is worth more than double that of oats. The same reasoning would apply to the wheat crop, so far as to the disposition of the crop. The 17.2 bu., is worth in the market $12.90. This would purchase 1720 lbs. of bran or middlings, worth to feed $18.92 on the above basis, and still leaving a manurial value on the farm of above $10.

The Corn Crop.— After the wheat crop of our state, the corn crop is of the next greatest value of any of our agricultural products, being $12,576,000. Here, again, we are dissatisfied with the low average yield of 34.5 bushels per acre, although we find a crumb of comfort, on the principle that misery loves company, when we compare the yield with the average of all the corn-states, 27.5 bushels. The year 1885 was a good corn year in this state. Our own crop was 70 bushels, with three loads of pumpkins and two loads of cornstalks.

Barnyard manure and good cultivation will do it. On our farm corn follows the oat crop. On account of the excellence of the fodder I grow a variety of Yellow Flint, which was originated on our farm, and has been grown there for twenty-five years.

Rye and Buckwheat.—Of the growing of rye and buckwheat, I have had very little experience, and have never grown a bushel of barley in my life, and never shall, so long as the brewers monopolize its use.

Details.— Of the details of grain-raising, preparing the soil, seeding, cultivating, harvesting and marketing, there seems to be no need of discussing here. The best methods are well known. There is improved machinery adapted for every part of the work.

To the farmers of Wisconsin I say, First: Grain raising is not recommended, except in connection with stock growing.

Second: Strive to produce large crops, maintaining, our yield high in the scale with other grain-growing states.

Third: make the most profitable use of the crop after it is grown.

Discussion.

MR. URQUHART.— Do you get better results by sowing oats on the sod than by planting corn? Wouldn't you get better results by planting corn on the sod and then planting small grain afterwards?

MR. HILL.— I had two reasons for adopting this plan some years ago. One was, in planting corn on the sod, sometimes I had it eaten by worms; the other was, that it was the only place where I could put the oats and have them stand up. If they followed any other crop they would not stand up. That is the farthest removed from the land that had been manured. In turning over the soil and sowing oats, then, I put on all the manure I can get, then follow the corn, then the wheat, then the grass again, so that the oat crop being the farthest removed from the sod, is the most liable to stand up. I would say that the figures I have given here as to the number of cows in this state, are taken from the statistics of 1885 and, of course, the dairy interest has grown wonderfully in two years.

EVENING SESSION—MARCH 27.

WISCONSIN'S AGRICULTURE.

By F. R NORTON, Racine County, Wis.

First Paper.

HON. HIRAM SMITH in the Chair:

Where the Profits Go.—I sometimes hear my neighbors talk in a discouraging manner in regard to the business of farming in Wisconsin. They say that the opening of the grain fields in the Northwest has taken the profit out of grain raising, that the great ranches of the far West have taken the profit out of stock raising, and that oleomargarine and its kindred products are taking the profit out of dairying.

A Discouraging Feature. — It is true, we have had one discouraging feature the past year, that of the great drouth, which I look upon as, after all, a more serious thing than these which I have already named, and yet it is one of the good things to be said about our good State, that drouths are not frequent here. I remember hearing one of the oldest settlers of Racine County making the remark that he had lived here a good many years, and never yet had lost a corn crop. Now, notwithstanding these unfavorable things I have mentioned, I must say that it is my sincere conviction that, for the capital required and for the risks involved, farming it the very best business in the State of Wisconsin, and, further, I must say that I believe that this good State of Wisconsin, which came as one born rather out of due time into this Union, is the best of all the States in this United States, in which to live and practice this, the highest and noblest of the vocations of man.

Our Resources. — I have traveled during the past thirty years through the West and South, and I never have seen an area that surpassed Southern Wisconsin for picturesque beauty and fertility, and, of later years, as the railroads have penetrated the great forests of the North, I have followed them hundreds of miles away into the wilderness, and I have come to realize that we have land and resources enough to make an empire. After all the other states about us had taken what they could get, they left us a piece of land three hundred miles long by two hundred and sixty miles wide, an area nearly equal to that of England. We have a population of over 1,500,000; England's population being some 25,000,000, and I believe that there are resources in our state which may develop so that we may support a population equal to that of England.

Forests and Lakes. — Now, what have we done in agriculture and how stands the case with us? As I look over this State, I find that it contains about 34,000,000 acres; about half of this we have divided up into farms, and about half of that again, or 8,000,000 acres, is improved. We have about 16,000,000 acres yet of unbroken wilderness of pine and hard-wood forests stretching away through the North, and then, as the Irishman would say, the best part of our land, after all, is the water. We have 3,000 square miles of lakes in this State; yes, gems of purest ray serene in native beauty. These lakes will yet be worth more to us than an equal area of land; have you not noticed already that these lakes in the southern part of the State have enriched the owners of their banks and have been year after year attracting the worn and weary toilers of the cities, seeking to secure rest and recreation, to their sides, and we shall find that these lakes will yet add vastly to the resources and the wealth of our beautiful State.

Farms and Farmers.—We find that the portion of our State which has been carved into farms is divided into 136,000 farms, the average size being 120 acres. Now, if we go to the old slave States, Virginia and the Carolinas, we will find a different state of things to exist. We have here scarcely more than one hundred farmers owning farms over 1,000 acres, but in the slave States you will find from five to fifteen hundred farms of 1,000 acres and over. That speaks of slavery and the centralization of wealth in the hands of a few. What chance is there for the development of farmers' institutes in a population like that?

Wealth of Farmers.—The average wealth of the farmers of this State, as given by our census of 1885, the average income from farm products per year, is about $4,200, which is a large average for the entire State; here in the southern part of the State, the average is, perhaps, twice that, seven or eight thousand. Just compare that for a moment with the condition of farmers in other lands. In England, Mr. Foster tells us that there are large districts in which the agricultural laborers have never accumulated so much as one week's wages in all their lives. In all Prussia, that magnificent country, that leads Europe to-day in material wealth, I am told there are only 108 estates that are valued at more than $7,500, while I can go through three great counties in Southern Wisconsin, and find farmers by the thousand who are as well off on the average as those noblemen of Prussia.

What the Farms Yield.—And what are the farms yielding to us here in the State of Wisconsin every year? First comes the grain product, $44,000,000, then the live stock product, $21,000,000, then the hay crop, $13,000,000 and so on. I might go on down through the list until I would gain a grand annual total of $98,500,000 poured into the laps of these farmers every year. But that census did not enumerate all of the sources of wealth, and those figures should be changed to at least $110,000,000, as the annual revenue of this State.

Credit of Farmers.—Our dealers in agricultural implements, speaking of the credit of the farmers of this State, tell me they don't lose from bad debts from the farmers of Wisconsin half that they do from those of other States in the West.

Cause of Our Prosperity.—Now, why is this high average degree of prosperity found in our State, or in any land? I will tell you. It is because some twenty-five years ago, we called the manufacturer to our side. We found at the opening of the war, which set all idle hands to work, and aroused industry as it never before was quickened in the history of the world, that every farm on the vast prairies of the West, seemed to call for an acre of our timber. The saw mill multiplied in the forests of the North and a new source of wealth came into this State, the manufacturer. First comes the milling interest with its annual product of $20,000,000., then the iron interest with $10,000,000 more and so on down through the list; the cotton and the woolen interests, until our manufacturers in their turn give us a round $120,000,000 a year, duplicating and more than duplicating the wealth which you derive from the soil. This is an equal balance of things that is rarely found in other States. Turn to Massachusetts. There all that her farmers add to her annual wealth is $24,000,000; her manufacturing products are $631,000,000, twenty-five times as much. What chance has the farmer's boy in Massachusetts? He must either go into the factory to work or come West. I can't remember the time when I was not waiting to leave Massachusetts and come West, and I think I found the State in which it is most desirable to stay.

Our Commerce. — Now, we have spoken of agriculture on the one hand and manufactures on the other, but I have not mentioned the third great source of human wealth, commerce. Did you ever think how admirably we are situated here in Wisconsin; how the great trunk lines that used to be seeking to get into Chicago are now with equal eagerness seeking ingress into St. Paul and Minneapolis and the new Northwest, and all those great lines of railroad must past over our territory; besides our great lakes and the Mississippi River, we have great advantages from our railroad facilities. In 1860, we only had 1000 miles of railroad in this State. Now, they cover the whole State with a net work—these railroads, that bring us as near New York as Vermont. Silently and steadily, year by year, we have emerged from the age of iron into the age of steel. We all know the price of carrying our products to the seaboard has been reduced nearly one-half during fifteen years, and the farmer has received the benefit of all this.

Value of Trees.—We have learned from the manufacturers the value of a tree, and it is time for us, as farmers, to put such lessons as this into practice for ourselves, and to apply the same principles of business and economy and system of management to our business as they do to theirs.

As I look over the manufacturing industries of this State, I find that these raw materials, these trees in the forest, have a wonderful value here. I have seen magnificent trees in Western Tennessee, where the value of the land is only ten dollars an acre against twenty-four dollars for our lands in Wisconsin, because they do not appreciate the value of those forests; they cut them down and burn them.

I once bought an acre of magnificent trees, the like of which you never saw, and I paid one dollar apiece for the trees the common price for timber in those regions, but one of those trees, if brought to Milwaukee and transmutted into articles of utility and beauty, would be worth more than all the cotton the Southerners would raise on that acre for five hundred years. The forests of Wisconsin and their products are known throughout the world. The farm wagons of Racine are as well known in South Africa as in Wisconsin.

Value of an Acre.—Let us as farmers learn the value of an acre. There is one man in Wisconsin who has honored his profession; he has honored nature and nature's God. I believe Mr. Smith, of Green Bay, has learned the possibilities of an acre of land; a good many of us have never learned that lesson. It took us years to learn that we must give back to the earth what we take away, and as soon as we began to bring science to bear on this question, the land rises to meet us, and it seems as though the possibility of a single acre is endless. When I first came to the State an acre of land that yielded ten dollars, did pretty well. Now, under the hands of skillful farmers, many are yielding a thousand dollars, and some even two thousand. If we will only treat the soil as God would have us, we shall find it indeed sacred soil, and I bow in reverence before our Mother Earth when I think of the boundless possibilities of wealth she has in store for us when we come to farm on the right principles.

Our Climate.— We hear a great deal about the salubrious climate of Southern California, but did you ever think, my friends, that we have a climate here in Wisconsin that is worth more to the raiser of food than the climate of Southern California? The average yield of wheat in England is but thirty-five bushels to the acre. They dare not make it any more with their damp climate; but we have a climate here that has endless possibilities for grain raising as well as stock raising. We can carry our crops up to almost any amount we please. I have read of as high as one hundred and five and one hundred and twenty-five bushels being raised, and now one grand discovery has been made during the past few years which is going to do great things for our crop of Indian corn—I mean the silo, which is as valuable a discovery to the farmers of this country as was the discovery of the cotton gin to the manufacturers down East, thereby carrying summer into winter and saving the heavy expense of winter feeding. What a treasure for our dairy interest! And we live just in the climate for the dairy interest, one of the most important sources of wealth to the farmers in the land.

Value of Animals.—Now, we should learn still further as farmers, the value of the animal. We are well stocked, as you might think, but there are very few farms but might easily double the number they have and not be overstocked. We have a goodly number of animals, but the trouble is they are not good enough; we have not brought blood enough into our stock nor brains enough. Take the horse. We are almost a generation behind Illinois in the breeding of horses. We have got a splendid market in the North, and these great cities so near us are calling for horses and wearing them out rapidly. There are some 17,000,000 horses in the United States, and it takes one and a half millions to take the places of those that are dropped out every year.

Our Dairy Enterprises.—Then, take our great dairy enterprises. We have about six hundred thousand cows, but they don't give milk enough, they don't yield butter and cheese enough. Mr. Adams says, the average product is only about one hundred and eight pounds of butter, and it can be made twice that easily. There is one encouraging feature in connection with our dairy and stock interests, and that is, there has been more improvement in the last seven years than in any previous twenty years.

Stock Raising.—Sheep husbandry is one of the great interests of the State of Wisconsin, and is also one of the most important of our branches of industry

Stock raising should be one of the great industries of this State, tributary to dairying.

Value of Men.—Now, friends, when we have learned the value of an acre, and the value of an animal, let us go a step higher, and learn the value of a man, and here is where we put a finger on the weak spot of our Wisconsin farming, after all. I have seen farmers make some mistakes in the raising of their colts and calves, but I have seen them make vastly greater mistakes in the raising of their boys and girls. I have seen the rich farmer treat his sons and daughters as the overseers in the South treat their slaves. From daylight to sundown they work like hired men and hired women. Now, I don't think boys and girls object to hard work, as a rule. I certainly did not. The only thing I objected to in my boyhood was this, that the time to go fishing never came. Farmers, we must give culture and education to our children. I say, give your children books, give them ennobling culture and a true practical business education, if you have to mortgage your farm to do it.

Industrial Education.— I am glad that the signs of the times are pointing toward industrial education. It is not simply book knowledge and technical learning we want, so much as a more comprehensive and varied practical knowledge, and if we will give this to our children, we shall not have so many of them fleeing from the farms and going to the cities. It is the educated farmers and farmers' sons who take their position at the head of each branch of their business. When you see a farmer engaged in the raising of blooded stock and making a success of it, you will find that he has, somehow, acquired the business knowledge and judgment which enables him to do business with other men of intelligence in that line. We must give to our boys and girls a comprehensive and practical education and we shall find them able to enter into and possess these rewards.

Favorably Located. — They talk about the attractions of the sunny South, but I notice that millions are poured into the snowy North. We live between the two great markets of the Northwest, whose wants we may supply in the future. There is no State so favorably located, and if we will, we may enter into this goodly heritage and we will find here all that human skill and God's blessing will give of wealth and power and comfort and refinement and beauty and civilization.

REORGANIZATION OF THE WEATHER SERVICE.

By T. C. CHAMBERLIN, President University of Wisconsin.

Second Paper.

Practical Education.—Charles Dudley Warner, in his recent article in Harper's Monthly, in connection with some pleasant things which he was good enough to say concerning our University, embracing some very appreciative words respecting our Farmers' Institutes, made some remarks which very broadly hinted that we were too practical in our educational efforts. Concerning this implied criticism, we feel very much as a distinguished English statesman did upon a famous occasion on which he was charged with the atrocious crime of being a *young* man. It is an accusation we shall neither attempt to palliate nor deny.

Weather Service and Agriculture.—Until a very recent date, however, I had no intention of adding to the apprehension of anyone that we are giving our thoughts too largely to the practical, in anything I shall say this evening. I had intended to speak upon a subject of a general character, whose tendency would be rather in the direction of the ideal than the practical, but there has been pressed in upon my attention a subject of special and immediate interest to every citizen, and of some especial importance to agriculturists to which, in lieu of a more abstract subject, I desire to invite your attention. I refer to the movement now on foot to transfer our weather service from the military to the agricultural department, which it is proposed to place upon an equality with the departments of State, Interior, etc. It is not, however, the transfer merely in which I seek to enlist your interest and influence, but more especially in connection therewith to urge a reorganization of the weather service, with a view to more satisfactory results than it has rendered in the past. I would carefully guard myself at the outset, however, against giving the impression that the weather service has thus far been in any proper sense a failure. It has been in a very important sense a success, and yet, in my judgment, it has been very far from being the fuller success to which it will yet come, and which it may attain at a very early date, if it is properly reorganized to that end.

Objections to the Present System.—The objections to the present association of the weather service with the military department, lie in the fact that this association is incongruous. Nominally, the signal service of the military department, and the signal service of the weather bureau, have something in common. In reality they have more that is incompatible in their relationship than they have which is harmonious. They are alike in being signal services, but otherwise, for the most part, dissimilar. The military signal service has an important function of its own to perform; it requires a training of a peculiar character, but quite different in its nature from that which is requisite in the weather service. At the time it was inaugurated there were special reasons why the military posts of the then unsettled West, and the connecting government telegraph lines, should be utilized, as they were the only available means over wide and important districts. But with the settlement of the country, this special dependence has passed away.

The chief objection to the present association, lies in the fact that the systematic military habit of thought, and the precise rigid method of military procedure, are not adapted to so eccentric a phenomenon as the weather. Our storms do not move in accordance with the laws of battalions. Their formation is not controlled by simple rigid rules like those of military procedure — indeed, the phenomena of the weather, in their complex phases and in their seemingly lawless methods of procedure, are those whose characteristics lie most remote from those which dominate military affairs.

But I need not dwell upon the desirability of the transfer. It does not appear to be a phase of the subject that needs advocating so much as action. When proposed to the last congress it appeared that the military authorities favored it; the agricultural department urged it, and congressmen were generally well disposed toward it, and nothing seemed necessary but to secure action, which was alone prevented by the pressure of other interests. It is now liable to fail of enactment chiefly from neglect, and from the obstacles to which delay is liable to give rise.

The chief consideration is the reorganization which should follow the transfer. This reorganization should be placed in the hands of expert meterologists, and should have for its aim the removal of the defects of the present system, and the attainment not only of a higher degree of precision in the forecasts of the weather, but a more definite and special adaptation of these forecasts to the agricultural districts and to the local peculiarities and needs of each.

Methods of the Present System.—You are familiar with the present system and some of the difficulties under which it labors. Observations are made at a large number of stations throughout the country, and these are telegraphed three times a day to Washington, where they are collated and the indications of the weather made up from the data thus afforded. Those indications, which are disseminated throughout the country at large, are chiefly made up in a very limited time after the receipt of the night dispatches. In this short time a large part of the collation of all this immense mass of data must be made, together with the formulation of the predictions and the sending of them forth by telegraph. When you consider the vast extent of our country, the complications introduced by the varied aspects of topography; of land and water; of forest and prairie, together with all those atmospheric complications of conditions and of movement that enter into the problem, it will be seen that the successful prediction of the weather in all its details, and for all of the districts, each with its own peculiarities, is a task which a single mind cannot completely perform. To expect complete success for any given locality is irrational under these conditions. The success which has been attained thus far is as great as could be anticipated. The system does not admit of the highest order of precision and of local adaptation. That you may appreciate the more readily some of the difficulties which enter into the task of prediction, I have prepared a map which will indicate some of the eccentric features which enter into the complex and difficult problem.

First Source of Error.—By a glance at it you will see that one source of error in the prediction of the weather, lies in the irregular and eccentric courses which some of the storms pursue. I have selected the courses of a number that passed over the country during a single year, and have indicated them by the black lines on the map. Some of these represent the usual courses of storms, and others those which are more phenomenal. It will be seen that the ordinary course is from west to east, with a slight northerly tendency; but it will be observed that there are very wide and peculiar departures from this general direction. (The peculiarities in the courses of several of the storms represented were then discussed in detail.)

Second Source of Error.—A second liability to error lies in the unequal rate of progress of storms, which is liable to introduce an error in the time predicted for the arrival of the storm. It is often as important to the farmer to foreknow the time when the storm will arrive as to know that it will arrive at all. When the observations show that a storm is advancing at a given rate, it is obviously natural to assume a continued advance at that rate, and to predict its arrival at a given point accordingly. It is only by a critical knowledge of the atmospheric conditions and a quick and complete appreciation of their effects that the change of rate can be anticipated. This implies a completeness of special knowledge of the atmospheric conditions over the areas involved and a mastery of the data thus afforded, which cannot be expected of a single man for the whole of so vast and diversified an area. On the map the daily advance of the several storms along their paths is indicated by cross-bars. It will be seen that the variation is very considerable, and that some storms seem to hang in certain localities with relatively slight advance for a period sufficiently long to completely vitiate a prediction based upon a uniform rate of progress. When this is taken in connection with changes in the course of the storms, it will be seen that unless the officer of prediction can forecast these changes of rate and of direction, his predictions are liable to the most serious errors. These changes in course and in rate are obviously due to atmospheric conditions, and a full mastery of these alone furnishes a basis for and anticipating their occurrence. They must, therefore, be accurately determined, and must be within the complete intellectual control of the officer of prediction. It is not impracticable to secure this for given limited areas, but it is too much to expect it of a single officer having in charge the forecasts for the entire country.

Local Influences.— A further source of inaccuracy arises from local influences. These vary with every considerable district, and while their influence may not be great upon the general storm movements they may be altogether decisive respecting the local weather when the meterological conditions are nearly balanced. If the atmospheric conditions are such that a slight influence will determine local rain or the opposite, the result can only be trustworthily forecast by a knowledge of the influence which local conditions bring to bear.

Topography.— Among these local conditions may be mentioned topography, which influences, more or less, the rate of progress of the storm, and which, by causing the currents to rise or fall, may determine whether there shall be precipitation or not. Rough topography retards the basal currents of the air, and causes those following in the rear to tend to mount over these, and thereby favors precipitation, on the same principle that an ascending slope does. In a similar way, forests act as a drag upon the basal currents of the air, while prairies facilitate their progress. Along with this comes also the cooling influence which forests exert, and the humidity which they yield to the atmosphere. According to current and rational theories, these conditions should favor precipitation, and perhaps determine it, when the conditions are otherwise closely balanced.

Among the local influences are the effects of large bodies of water. So also, according to the observations of my friend, Professor King, the presence of great banks of snow that linger on our northern borders after the surface here has become entirely bare, has a notable influence upon the course and character of storms. The nature of the soil in respect to temperature and the state of the surface, in respect to its covering of green growing vegetation on the one hand, or of dried and seared vegetation on the other, come in as tributary influences. The dryness or wetness of the surface also have their influence. It is an apparently well sustained observation of farmers that, especially in dry seasons, showers have a tendency to follow each other in their courses, apparently because the moistened surface resulting from one shower favors the development of another in its rear, and thus there arises a cumulative effect. The belts fortunate enough to be moistened by the earlier showers have a better chance of being favored afterwards than those belts which were avoided by the earlier storms; whose very dryness gives them a less favorable prospect.

Now, these local elements are altogether beyond the intellectual grasp of a general observer situated at Washington. It is entirely beyond the capabilities of any mind, however retentive, and however masterful in its power of coördination, to keep in mind and combine all the modifying influences that spring from the diversities of the surface of the land, and from the previous precipitation. This being true, local precision and adaptation in the forecast of the weather can only be secured through extensive local observations and through the establishment of local centres of prediction. It is not of so much importance to farmers to know the grand features of a storm which sweeps over the whole country, as to know those specific phases which it will present as it passes over their immediate locality.

State Weather Service.—There should, therefore, be such a reorganization of the general system of observation and of prediction as shall embrace smaller districts, each having its own sub-organization and its own officer of prediction, the whole to be coördinated into one great organization, which shall perform the general functions of the present one. Each of these districts should receive the benefit of the observations in all other districts which affect its atmospheric movements. The observations of each district should be directed to the specific determination of those elements of the weather which are dependent upon local influences. The size of these districts will have to be determined by experience. That such an organization is ultimately to be reached seems to be clearly foreshadowed by the history of the present one. The large districts of prediction have been in a measure abandoned, and forecasts are now largely made for the several States separately. To a limited extent local centres of prediction were inaugurated. This movement is in the right direction, but needs development and systematic organization.

An auxiliary benefit of the orgnization should come in the establishment of a State Weather Service. Many States have done this already; we have not done so. The function of the State service has been thus far, and should largely continue to be, the distribution and display of the weather forecasts, and the recording of observations at as many points as practicable, thus supplementing the work of the general government.

Summary.—To summarize, I would urge, as is now being done in congress, the transfer of the Weather Service from the military to the agricultural department, and in connection with the transfer, the reorganization of the system so as to provide more completely for observations and predictions having specific adaptation to the local conditions of the several districts of the country, embracing the establishment of local centers of correlation and of prediction, and I would invite your coöperation and good influence in the effort to secure this more effective development of our National Weather Service.

INDUSTRIAL EDUCATION.

By W. I. CHAMBERLAIN, Pres. Iowa Agricultural College.

Third Paper,

The Human Hand.—The human hand is one of God's most wonderful creations. It is the only universal tool. Rightly trained itself and guided by a well-trained mind, its feats are well nigh Godlike. It is the creator of all things devised by man's mind, the tool that makes all intricate machines. The microscope, the telephone, the steam engine, the spinning jenny, the Brooklyn bridge, the countless things of delicacy and strength that make and adorn our civilization, are its creation and its handiwork as truly as they are the mind's conception.

Mistake of the Old Systems.—These three things, the thinking mind, the speaking tongue, the working hand, are the things that lift us up above the brutes that perish. They form the tripod, so to speak, on which manhood stands. Take one of the three legs from any tripod and it cannot stand. And yet this is just what our systems of education have tried to do; to train the mind to think and the tongue to speak, but not the hand to do. Is it any wonder that invention and construction were so slow? When Von Bulow thrills your very soul by his magic touch of the piano, it is because his mind flows through his trained finger tips and makes responsive keys and vibrant strings breathe forth the passion of his soul. But what if, now, those finger tips were senseless and untrained? Or, rather, what if Von Bulow had trained his soul and not his hand, and some other one had drilled his hand and not his soul? Could the two men have given us the matchless music of Von Bulow? And yet this seems just the mistake of our old systems of education and training. They trained the mind to think; less often the tongue to speak; but not the hand to do—not the mind to think through the hand of skill, the whole body to do with skill the bidding of the thinking mind. Or rather, they trained the mind of one man, and the hand and body of another, and then wondered that the two did not work as one of the great problems of invention and construction. They tried to divide Von Bulow into two men, one with soul-training, the other with hand-training, and expected the two distinct and discordant halves to unite and make the great pianist of the present day. They tried to put assunder what God joined together. They failed to see that as soul and body are themselves inseparably joined, so should their training be; that the mind's knowledge is power only when the skilled eye, hand or tongue, or the whole body, makes it to be applied knowledge. Slowly is the truth at last dawning upon us—great truths dawn slowly always—that true education is a symmetrical unfolding or training of all our faculties and powers.

Perpetuity of the Republic.—The only right that a republic has to compel the property to furnish an education, and the youth to get an education, rests, I think, on the assumption that education makes the youths better and more useful citizens, and is therefore essential to the life, growth and perpetuity of the republic. This assumption is a true one provided the education fosters and promotes not only knowledge but also virtue, patriotism and useful skill—the power to use the knowledge for the good of the republic. If virtue be lacking, the republic goes to its death through sensual indulgence and sin, like the republics of the past. If patriotism be lacking, the republic dies through individual selfishness. If useful skill be lacking, it dies through the poverty of the common people.

Schools in the Past.—Our schools in the past, I think you will admit, have promoted knowledge, and on the whole, virtue. But they have neglected patriotism and skill. As to patriotism, our beloved Garfield had this to say in an address in 1867, soon after the war:

"There is not now, and there never was on this earth, a people who have had so many and so weighty reasons for loving their country and thanking God for the blessings of civil and religious liberty, as our own. And yet seven years ago there was probably less strong, open, earnest love of country in the United States than any other nation in Christendom. It is true that the gulf of anarchy and ruin, into which treason threatened to plunge us, startled the nation as by an electric shock, and galvanized into life its dormant and dying patriotism. But how came it to be dormant and dying? I do not hesitate to affirm that one of the chief causes was our defective system of education. There was scarcely a college in which more than four weeks out of the four years' course were devoted to studying the government and history of the United States; for this feature of our school system I have neither toleration nor respect."

Such are Garfield's wise and memorable words. I might add that the war itself would not have been possible if a thorough knowledge of and love for our country had been instilled in all our schools and colleges. But the war helped to correct this evil, and now the science of civics, or the knowledge of our government and of the rights and duties of citizenship under it, is made a study in nearly all our schools and colleges, and with the best results.

I have spoken thus clearly, though briefly, on these three essentials in an education, to make it plain that while I would bring in the new, I would not destroy the old; that I would supplement, but not supplant.

Duty of the State.—I come now to discuss the fourth point, viz.: The right and duty of the State to give its youths facilities for acquiring skill to use the knowledge given by the State. Is it not strange that this should ever have been questioned? Since in the end the State supports those who cannot support themselves, shall it not most wisely train the young in the best means of supporting themselves? Since paupers and criminals are everywhere a burden to the State, should not the State in very self-defense provide that there be fewer paupers and criminals, by furnishing to the young the means of gaining useful skill as well as abstract knowledge? Is not this the clearest and truest political economy? Think of a school system that gives to the son of the skilled mechanic in the city ten solid years in four grades of arithmetic, a perplexing and interminable labyrinth of intricate arithmetical puzzles, and of abstruse linguistic analyses in two or three languages, and three or four years of the higher mathematics, of literature and of mental and natural science, and then graduates him from the high school and launches him upon the world without the skill of hand and eye to drive a nail, saw a board off square, or handle any tool or machine of useful industry; not only this, but our schools have, perhaps unintentionally and perhaps unconsciously, but none the less surely, turned our youths away from such callings. They have taught the sons of city mechanics and trade workers to despise the useful skilled employment by means of which their own fathers support them in the school in unproductive leisure.

School-Bred Boys and Trades.—Is it any wonder that our own school-bred American boys in our cities have not gone largely into the trades of physical skill, and that the farther on they go in school or college the less likely they are to enter such employments? The fact is unquestioned. It is a trite remark, "the boys are leaving the farms," but it is still more true that the sons of skilled physical workers are leaving the productive callings of their fathers, and going into "the kid-gloved occupations."

Many explanations are offered. Some say it is because the boys want a calling in which they can exercise their minds in thought. But the mind is as truly exercised in skillful work as in language. Orators, poets, writers, express thought in language. Generals, architects, inventors, mechanics, breeders, horticulturists, express their thought in action. God himself expresses his divine thought in action, in the ongoing, never ceasing, ever new creation of this world, with its manifold and marvelously thoughtful adaptations. Who then shall say that it is less thoughtful or less noble to express thought in action than in word, in doing than in saying, provided real thought be expressed? Who was it that worked at the carpenter's bench in Nazareth from childhood to his 30th year, as a preparation for that short three years of thoughtful teaching, of love and sacrifice that redeemed mankind and made real civilization possible? Who then shall be ashamed of the carpenter's bench or of any other tool or trade of skill, or who shall doubt that such trades may give true and noble expression to thought?

Why Boys Leave the Trades.—Others explain that our boys leave the trades and throng the clerical employments because of a natural distaste for physical activity. But we know this is not so. Boys often hate books, "dry fractions," interminable "partial payments," the labyrinth of subject, predicate and modifiers, of mood, tense, number and person, of gender and case, of agreement and government. But did you ever know them to vote against a picnic, or a vacation, or in favor of a shorter recess, so that they might stick more closely to their clerical employments? No; their very natures delight in physical activity. They romp and whistle, and run and shout. No, they do not shun the skilled trades from any distaste of physical employment. They do so, first, I think, because the schools have given them no drill and little knowledge to fit them for any skilled physical employment, but have given them much drill and special knowledge to fit them for clerical and professional life; and second, and largely, because the schools for centuries have cast the mantle of respectability and aristocracy about the clerical employments, and have denied the same mantle to the trades of physical skill. Clerks and copyists ranked higher, socially, in old times than skilled artisans did, I think, because reading, writing and copying were purposely confined to the learned few, and withheld from the common people and even from the skilled artisans. Hence, physical labor commonly went with ignorance or servitude, or both, and, partly for this reason, was deemed menial and disgraceful for the free born and educated. In this country, slavery gave the same results at the South, and fostered the same opinions as to all kinds of actual, money-earning physical employment.

Literary Colleges.—Then again the literary colleges, followed by the professional schools, trained men for law, medicine and divinity. The military schools trained for the profession of war. The commercial colleges trained for commerce and trade. None of the schools trained for the trades of manual skill. In a word, they trained men for literature, commerce and destruction, but not for production. Until lately, no schools in all our land taught the sciences and arts of skilled productive industry in its strict or narrow sense.

Three results inevitably followed. First, those whose minds were trained to understand the facts and principles of science had not the skill of hand to make their knowledge useful to mankind by embodying it in inventions. Second, those with trained hands had neither the knowledge of principles nor the mental drill to make their skill of hand reach out toward inventive construction. Third, invention, therefore, circumscribed on all sides, was inevitably slow; while those who had the knowledge and mental training of the schools used it to hold down in poverty and servitude to themselves those who had not the knowledge to defend themselves.

Train Mind and Hand.—At last, a little more than a century ago, the idea finally took root in Europe that mind and hand should be trained together, because, first, through reciprocal influence, each could thus be trained better and more rapidly, and, second, when thus trained, both could far better work together through life; that the hand should be taught to apply to human use the secrets wrested from nature and from life by the joint grasp of mind and hand. This lifted skill of hand into the realm of thought, without degrading the realm of thought. Then and therefore was ushered in that marvelous era of investigation and construction that developed and seized hold upon the economic law of "the division of labor," increased four-fold the actual creation of wealth, and made possible our modern civilization, with its universal comfort and well-nigh universal luxury, to earnest, skillful workers. For now, with learning and skill combined, and using nature's materials and forces as the servants of mankind, there was no longer any excuse for human ignorance or servitude.

Apprenticeships Destroyed.—It was a social and economic revolution. But all revolutions require new adjustments. Note, then, with me, one new adjustment needed here. When the cabinet-maker, for example, himself by hand made every part of each bureau, desk or sofa, from the selection and seasoning of the lumber to the final varnishing and trimming, he took one or two apprentices into his home and shop and slowly taught them all he knew, as he himself had learned it, by severe and plodding toil. But now when an article of furniture is, with a hundred or a thousand more of like pattern, the quick product of fifty men and as many machines, in some great factory, the apprenticeships are by this very fact destroyed. The age is too rapid for the old, slow growth of an apprentice, with the consequent waste of material and power. What the mechanic and machinist of to-day need is a thorough knowledge of the principles of mechanism and of the working of machinery, with ready skill and deftness in the use of tools, and the main point is that he needs this before he goes into the manufacturing establishment; just as the lawyer and doctor need their knowledge, and in part their skill, before they touch their first case or patient. This sort of knowledge I think our schools should give to those who are to be our skilled workers, just as they do similarly related knowledge and skill to our professional men. This is industrial education.

The Apprentice System.—There is immense economy in this kind of education as compared with that given under the old apprentice system. The apprentice was ignorant of book knowledge in the main; hence slow to learn handicraft, servant of servants, bound to his master by indenture, working where and at what he could earn most for his master, and not where he could learn most for himself,—sifting sand, carrying hod for the mason, piling lumber for the carpenter, "devil" and ink spreader for the printer, absorbing slowly through his hide, as it were, and by "rule of thumb" less knowledge and skill in seven years than he can now acquire in a single year in a good trade school, as has been lately proved in New York city.

Teach the Trades.—Now, since the apprenticeships are a thing of the past, and the trade and labor unions, from mistaken hopes of controlling competition, are closing, as far as possible, the chances for boys to learn the useful trades of skill, I see no resource left but for the state to teach these trades, or, at least, the general knowledge and skill that under-lie success in all trades. The state already gives all its children literary and mathematical knowledge. Many states carry all who wish through high school, college, medicine, pharmacy, dentistry, law, engineering and the like. But until lately in America our state and municipal governments have taught skill of hand and eye only to the unfortunate and criminal classes; in the deaf and dumb, the blind and the imbecile asylums, the reform schools and farms and in the penitentiaries. Even the name industrial school is disgraced and insulted by being applied to penal schools, in which boys, too dull to learn or too vicious to be controlled by teachers and parents, are sent and taught a useful trade of skill as the punishment. What can be the logical conclusion but that skilled industry is irksome and disgraceful?

Do you wonder, then, that our American boys are not flocking into the trades of skill, when the only avenues of approach until lately have seemed to lead through the reform schools or the penitentiary, and when all the respectable schools and colleges have been fitting men for the clerical employments and for commerce. If the state would teach these trades of skill more in the schools outside, it would have fewer men and boys to teach inside the reform schools and penitentiaries.

Do you say the state cannot afford to teach the rudiments of skill along with the rudiments of abstract knowledge? Is not this to say the state cannot afford to give the skill that creates wealth, while it can and does afford to give the knowledge that distributes and enjoys wealth? Is not this an evident absurdity in economics.

Trade Schools in Europe.—Fortunately this is not mere theory. Thousands of technical and industrial schools all over Europe, munificently endowed by government, have been for years sending forth annually hundreds of thousands of well-taught and well-trained workmen into all the trades of skill, including agriculture. The material wealth of Europe has been greatly increased, nay, the very life of its crowded populations has been sustained, by the skill, made well nigh universal by these schools. Our sparseness of population and our broad domain of virgin soil have made us slow in this work of industrial education. And so the skilled workmen of Europe are filling the best paid positions of high skill in the trades, which should be filled in large part by American boys. Why? Not from any fault of theirs or of our boys, but simply because they have been trained in Europe to fill these places skillfully, and our American boys have not been so trained here. Can our government longer afford this? I think not. A good trade of skill, well learned, is worth more to a young man than $20,000 out at interest without the trade or its equivalent of knowledge that he can use in doing something that the world wants done. The world asks the young man fresh from school never "How much do you know of books?" but always "What can you do, and do it better than the bulk of men?"

Clerical Callings Overcrowded.—For reasons partly given, or rather hinted at, the clerical callings are overcrowded. Yielding too, to the inevitable law of supply and demand, they are worse paid than trades of skill. The social standing of the former, however, is higher, partly as a legacy of the past, and partly because our schools still cast the mantle of respectability about the former and not about the latter. The social standing of the latter will rise just as soon as our schools show the same favor here as to the former. For in the ultimate analysis the occupations of men should and will in time grade socially according to the degree of intelligence required and used in their performance.

The demand for skilled manual training is more pressing in our cities than in the country. Country boys on the farms gets dexterity, knack and self-reliance. What they lack is chiefly scientific knowledge. City boys get nothing but book knowledge in the schools and the business sharpness that comes from contact and attrition in crowded centers. Now it seems to me that as we train and equip our lawyers, doctors, veterinarians and business men in schools with all needed appliances, moot courts, hospitals, clinics, dissections and the like before they enter actually on their skilled professions, so must we have schools for technical and manual instruction and trade instruction with all the appliances and means of drill, for the future mechanic and machinist, foreman and inventor; and scientific agricultural instruction and drill for the future farmer, stockman and horticulturist.

Public and Private Schools.—Public and private liberality have within twenty-five years established large numbers of agricultural, mechanical and technological colleges. You have not failed to notice that nearly all the recent munificent private gifts and bequests have been to endow colleges of this sort. They are becoming numerous and well-equipped. What we now most need is schools of lower grades for the same sort of training. We need a public manual training school along side of every city grammar and high school, where principles of mechanism and deftness in the general use of tools shall be given; and perhaps private trade schools, where at night, for moderate tuition, training in specific trades shall be offered.

Do you say this is hopeless? It is already well begun. Public manual training schools are already found in nearly all our great cities, and private trade schools in a few. I have visited many of the former and some of the latter. I have talked with city school principals and superintendents and read their printed statements. Their testimony is unanimous that pupils do the regular book work of the public schools better where they have this manual drill besides; that it is not a hindrance but a help to the regular school work.

Skilled Manual Training.— The introduction of skilled manual training into our public school system will not today excite greater opposition nor work a greater revolution than did the introduction of industrial drawing some thirty years ago. It will not cost the State so much as "free text books," now urged by many. The three steps historically have been: first, to read and talk about things; second, to learn to make drawings of the things; third, to examine sharply and learn to make and use the things themselves. For centuries our schools took the first step alone. Some thirty years ago they began to take the second, a great advance. Now we are about to take the third. When we shall really have taken this third step, then and not till then shall we have learned to walk.

ENSILAGE SESSION—MARCH 28.

FIELD CORN CULTURE.

By D. F. SAYRE, Rock County, Wis.

First Paper.

H. C. ADAMS in the Chair:

Clover and Corn.—There is an old adage to the effect that "well begun is half done," and in regard to field corn culture that adage applies admirably. There are two crops which, as a farmer, I like and which supplement each other. I refer to clover and corn, and it seems to me that to grow a crop of corn I have to begin the year before I plant it. Clover and corn supplement each other, because the protein that we find in the hay supplements the fat-producing corn, and if I have fed properly, instead of feeding out five bushels of corn, I have only fed two and a half bushels, supplemented with two and a half bushels of some protein feed; otherwise I have lost the proportion of benefit in the excess of one kind of food over the other.

When I Sow Clover.—I always sow my clover in advance; I sow it two years in advance, and I do it in the first place to give me a beautiful mat of growing verdure from early spring till late fall, because the rains of heaven bring to me the fertilization that I need for my corn, and the clover lies there like a great sponge to hold those fertilizers just where I want them for the corn crop. That is the natural process of fertilizing my land. Then, again, this clover goes down to a greater depth into the ground, to bring up the mineral elements that we need for our use, and stores them on the surface. This it does by some wonderful machinery, storing these mineral elements right in its roots near the surface of the ground; it gets it in some way from the air above or the ground beneath. Still another reason why I like to grow clover is, that there is no way in which I can cultivate my field and get a seed bed for my corn, with the ease and certainty that I can by growing clover.

Turn Under in October.—Then, in the month of October, turn under your clover, and I like to turn it under uncut. I think there is additional benefit, and then we will see the mechanical influence of clover in the softening of the ground, in breaking it up and pulverizing it, and in no other way can I get such a good seed bed to use in the spring. So far before planting I have my seed bed; I put on my disc harrow and run it this way and that way, until I have fully broken up that seed bed and made it level. What do I do then? I want to plant something on it. I want seed corn, and how shall I get it?

Early Maturity of Seed.—The preceding year, in September, at the latest, I go into my field and look for the seed that I want. I look in the first place, for the early maturity of the seed; not the earliest. I think if we look for the earliest, we are apt to cause the corn to degenerate; the crop will grow less and less. But I do look for early, fair maturity, and I look for another point. I mean uniformity in getting the seed; I don't want one ear of one kind of corn and another ear of another kind of corn for my growing crop; I want seed that shall be as nearly uniform in maturity as in size, in color, in looks, and with those two points before me, I go into my field and pick my seed corn, not later than the first of October.

Fire Dry the Seed.—What then? C. R. Beach says: "Take the corn and fire dry it, and that is the whole sum and substance of it." I want this seed artificially dried and cured. We have met many farmers who say this is not necessary, but I beg leave to differ from them. Once in a while your corn will come out all right without any artificial heat, but we have to move in such a way that we shall be certain. So I say, take the corn in any way you choose, only that artificial heat shall come to it in some way, to dry it before the severe freezing of winter shall come on and hurt the germ.

Planting the Corn.—Now I have my seed and my seed bed. How shall I plant it? We all know how. We have our two-horse planter and we plant it; some plant in drills. I like to plant in hills, with the rows three feet eight inches apart, and about the same distance in the row, but it doesn't make much difference except this: It wants to be planted a fair depth; so deep that the dry weather shall not retard its growth.

Dragging the Corn.—The first important thing in the culture of this crop of corn is the dragging—the harrowing of the corn—before it shall come up, and that is something we all have been negligent about. We differ a great deal about the extent of harrowing. I don't like, myself, to harrow it after it barely comes up, but if we will put in our harrow after we have planted it just as soon as we can, within a day or two, and go along and harrow that corn, killing the germ of the new weeds which have come up, we have accomplished a great deal. We have half cultivated that corn when we shall have gone over it with the harrow twice or even three times before it has come up.

Cultivating the Corn.—I cultivate my corn so as to keep it level. The old fashioned way used to be to hill it up but I think the best success is in level culture, moving the surface of the ground just as often as we can conveniently before the corn gets beyond our reach.

I don't know that I have any other process. I only know that if I can have a bed of clover to plow under; if I can get at it fairly early in the spring, with my disc cultivator; if I can plant it with the corn planter about two and a half inches, or a little deeper than that, I can get it in the moisture, and if I can work it two or three times just before it comes up, and then as it comes up, I am almost absolutely sure I shall have a crop of corn.

Last year I failed in my corn because I had no clover bed. My neighbor had a good crop of clover, and plowed it up in the spring, and for miles around his was the only piece of which you, gentlemen, would have said: "There is a field of corn."

Discussion.

MR. CADWALLDER.—Do you plow under the second crop of clover?

MR. SAYRE.—Yes, my rotation has been one of four years. I want to say another thing that I forgot. If, at the last cultivation of the corn, we will sow on a crop of rye, say the last of July, we will get a crop of rye started so when we come to cut up our corn-fodder, we will let the rye grow later in the fall and feed it to our sheep and cattle and thereby we have the fodder for our cattle and sheep and off the same land we have a green growing crop, which shall store up the elements near the surface, thus giving us two results.

MR. NORTH.—I understood you to say you harrowed your corn three times before it came up.

MR. SAYRE.—I would like to do that. I would like to keep the harrow going all the time after I planted, until it comes up. The difficulty I find is when it just comes up; the first inch is more tender than when it gets up further, and, therefore, I want to straddle the row very carefully; it is more dangerous just when it comes up than it is before or after. I don't think it hurts to step on it before it comes up. It may mash it down some, but I don't think it hurts it as much as it does it good.

MR. COOLIDGE.—Don't you harrow both ways?

MR. SAYRE.—Yes, sir.

MR. HOARD.—Harrowing corn is becoming a very general practice with us, and I notice that corn is harrowed later and later every year; men are harrowing it when it stands taller than they ever supposed they dared to do.

MR. ANDERSON.—I harrow corn when it is from six to eight inches high, and it does not injure it so much as to harrow it when it is one or two inches high; but I harrow the corn ground thoroughly before planting it, if the season is favorable, and it don't require so much harrowing before it comes up, and I wait until after the corn is up. When the land is prepared as Mr. Sayre says, I don't think it would need harrowing so much. Just before my corn comes up I roll it and harrow it thoroughly.

MR. HOARD.—Do you make any provision for the teeth running too deep?

MR. ANDERSON.—No, I have a very light harrow that will take in five rows of corn, which is made specially for harrowing corn, and the teeth are not set as deep.

MR. HOARD.—The practical use of harrowing corn is only to start about half an inch of the surface soil.

MR. ANDERSON.—I like to start it about an inch and a half. You will find that the weeds will start two inches below the surface, and there are only two ways of killing weeds, that I know of—one is by tearing them up, and the other is by burying them.

MR. HOARD.—A harrow fixed with lugs so that it will enter but about half an inch you will find will do most excellent work.

MR. SAYRE.—The first harrowing I ever saw of corn was in Will County, Illinois. To my surprise, the farmer had taken a two-and-a-half foot roller and had rolled over his corn lengthwise, when the corn was standing six or eight inches high. Then he put his harrow on and harrowed it, and I said: "My friend, that field is ruined." In a week's time I came back and that corn was standing up as straight and nice as could be, but I wouldn't like to try that myself.

MR. STEWART.—How deep do you plow that clover under?

MR. SAYRE.—About four and a half inches. If I plowed in the spring, I should plow it shallow.

MR. ROBINSON.—I have a method of cultivating corn that I like very well. My corn ground is marked, and just before the corn comes up I take my horse cultivator (two of them if my field is large) and cultivate the rows, just as if the corn were up; then I cross it with my harrow, and you can get the start of the weeds. That is an excellent way where the ground is hard; I have followed it many years.

MR. GOULD.—That is an excellent way where you drill in your corn.

FODDER AND ENSILAGE CORN.

By JOHN GOULD, Portage County, Ohio.

Second Paper.

Value of Fodder Corn.—This question of fodder corn has come up in a new form within the last three or four years. We are just beginning to realize the value of fodder corn. For the last three hundred years, I presume, we have been acting on the principle that all there was of the corn crop was the ear corn, and wasted largely the stalk. Whereas, if we had known better, we would have found that the stalk had almost, if not quite, an equal feeding value to the ear corn. Sixty millions of acres of corn are raised in the United States annually, and forty-five million head of horses and cattle eat up our meadow hay and our corn, whereas, if our corn fodder could have been saved it would have been ample, I think, to fully winter all our cattle. The silo has brought new revelations to us, and given us a value in fodder corn that we have never had before; at least, it has called our attention to it in a way that we have never had it called to us before, so that we have now begun to make a study of fodder corn, and what it may do for us in the way of giving us cheaper and better rations for our cattle. We are beginning to find out that the average farmer must devote about two or two-and-a-half acres of meadow land to it, to get the roughage to winter a cow or steer. If he will put in his fodder corn and take care of it, in the new ways, he will get the roughage on an acre that is ample to winter two or three head of cattle.

Its True Feeding Value.—This brings us to the question, how shall we get this crop, and get its full feeding value? In the past, we have failed to recognize that nearly, if not quite, sixty per cent. of the feeding value of corn is the gift of the sunshine and of the air, and in the past, when we have been sowing our fodder corn, we have attempted to get as much as possible in the way of seed upon the ground. Most of us have been sowing from two to four bushels of seed corn upon an acre, so as to make the corn thin and fine so the cattle shall easily feed from it. Later demonstrations with fodder corn have taught us this lesson: That we should not plant over eight to twelve quarts per acre, in the form of drills, the idea being to let the sunshine and air have free circulation into our rows of corn so it shall develop; so we plant the corn very thinly and force its growth, and in this way get its feeding value. It has been demonstrated by the Massachusetts Experiment Station that corn sowed in the usual way, three bushels to the acre, has only about eleven per cent. of feeding value to the one hundred, but with our best field corn it runs above fifty per cent. feeding value, so we get approximately three times as much by planting thinly. Then, our later system of putting up corn fodder in silos, has demonstrated that we need to care for our fodder corn better, by letting it stand in the field and mature at the last part of the life of the corn. How shall we do this? By planting it earlier, so as to get a growth. Remember that one week of the first life of a corn plant is worth nearly three weeks at the close of its life, in adding to it maturity and growth. Another thing that we are finding out about our fodder corn is, that its intention in life is to grow grain, and just as we deprive it of that by crowding it, we are detracting from its value. So we want to plant early, so it shall get length of season and grow a good plant; we want to let it mature so as to get all its feeding value, and then we want to preserve it in some way so as to get all its value at the last. How we shall cultivate this corn, has been very well said by Mr. Sayer.

What Kinds to Plant.—Just what we shall plant for fodder corn is a problem that is under discussion to-day throughout the north—whether we shall plant our best varieties of dent corn, acclimated to our localities, or whether we shall take the big Southern corn from the tide-waters of Virginia and get a larger weight to the acre, but whether more food, is a matter that we must demonstrate for ourselves. We must have a crop, anyway, and it has been demonstrated, during the terrible drouth of last year, that the Southern corn has wonderful vitality and makes an almost sure crop. I planted four varieties alongside of my ensilage corn. The ensilage corn was a magnificent crop, while the three other crops together would not more than average with the ensilage corn. Plant some kind of fodder corn; let us abandon feeding quite so much expensive hay, when we have a crop that will give us a big, abundant ration for our cattle cheaply, let the weather be what it may.

Discussion.

THE CHAIRMAN.—Tell us how to cut the corn and put it up and feed it dry.

MR. GOULD,—My plan of cutting for the last two years has been wholly with the reaper, which leaves it in gavels on the field. I wilt it about twenty-four hours, and then put it in the silo. Previous to that time it was my plan to wilt it and put it up in bundles, about twenty-five bundles in a shock. I put it up about sixty to seventy-five bundles, and make a roof over it.

MR. SAYER.—Are there not facts to show that the Southern ensilage corn has more saccharine matter than our common field corn?

MR. GOULD.—I am not prepared to say exactly that, but I am prepared to say that the cattle will consume the Southern fodder corn when they will absolutely refuse to touch our field corn. During the past summer, I fed some to my dairy cows, right in the pasture, and, even there, it was almost impossible to find as much as a butt left over. This fodder corn should not be put up in two big a shock; it is very likely to mould unless it is wilted nicely.

MR. ISLER.—Do you cut your Southern corn with a reaper?

MR. GOULD.—Yes.

MR. ISLER.—If it grows as big as that

which I have, you would have pretty heavy work. I had some that grew seventeen feet high, and the stalks as large as that lamp; it may not grow so large in your part of the country.

MR. GOULD.—It grew on the average twelve feet high. My neighbor and I cut it between us, by using a sweep-rake reaper. Of course, you want to make an extention to your reaper—put cleats on, so they will run out two feet more. I have had no trouble, and it is a great deal cheaper than any other way. You can cut in two hours what it will take two days to cut by hand.

MR. WISE.—Can you cut in windy weather?

MR. GOULD.—It will tangle more, of course.

PRES. W. I. CHAMBERLAIN.—I have no doubt there is more saccharine matter in the Southern corn than in ours, but the principal point in this matter is that it is absolutely impossible for any of our varieties of Northern corn to raise the amount of fodder per acre that the Southern corn will. There is twice the leaf growth on the Southern corn that there is on ours; then there is twice the stalk growth. But with us, in Iowa, it is simply impossible to cut it with a reaper. I am not a betting man, but I have $100 for anybody who will do satisfactory work, with any reaper yet made, in our Southern ensilage corn. The main trouble with us out there is, that we have winds, and we have them strong, and they tangle the corn so that it is simply impossible for any reaper to handle it. I should like to see a reaper that would handle stalks seven inches in circumference, even if it is not tangled. In spite of the fact that it is a temperance State, it gets the tangle-foot once in a while.

MR. GATES.—How am I to know whether I have got the right seed or not?

MR. GOULD.—You will have to depend on the reliability of your dealer, just as you do when you buy anything else, not knowing where it is produced. There are several different kinds advertised, but I understand it is all substantially from the same locality. The B. & W. is the brand of the firm who first handled it, and there may be other corn from the same locality but sold under different names. It is sufficient for you to find out, as near as may be, that it is the tide-water corn from Virginia, and not a white corn from Kansas or Missouri, sold under the name of the B. & W. corn. There are agents who can be depended on to sell you the right thing.

THE CHAIRMAN.—What is the sheep-tooth corn?

MR. GOULD.—I don't know, unless it is a brand that the Southern corn is sold under; it may be the same thing.

MR. GATES.—Now, some, in advertising, say that the sheep-tooth will bear more leaf.

MR. GOULD.—It can't bear more than the Southern.

MR. PALMER.—Last spring, I bought the Burrell & Whitman, and paid two dollars a bushel for it, and I got some from Chicago for one dollar, and I couldn't see any difference. The man who handled the B. & W. corn visited my home, and he couldn't see any difference. All there is about the ensilage corn, in my opinion, is: It is Southern corn, and it don't make any difference whether we buy it under the name of B. & W. corn, or under any other name.

MR. GOULD.—We had a lot from Georgia that was not ensilage corn at all.

MR. J. M. SMITH.—I received, last summer, what purported to be a report from a Professor of Agriculture in New Hampshire, in regard to the different varieties of corn, and the tests they have been making there with corn and ensilage, and for feeding. The Southern ensilage corn, in that case, yielded twenty-five tons per acre. Varieties of our common flint corn yielded fifteen tons per acre. A chemical analysis of the two varieties showed that the common New Hampshire corn was just about equal in feeding value to the ensilage corn per acre; that is, the fifteen tons of the flint corn were just about equal to the twenty-five tons of the Southern ensilage corn. The tests in feeding were practically the same, so that the final conclusion from that test was, that they were handling ten tons of ensilage corn for nothing. Now, if further experiments shall show that those results are correct, it is a great advantage for us people in the far North, where the ensilage corn will do its best, that we can substitute our flint varieties for it.

MR. ADAMS.—Was that B. & W. corn planted thick or thin, and was it properly matured or not before it was cut?

MR. SMITH.—I don't know about that, the report did not state those facts.

MR. HOARD.—Do you think, Mr. Smith, that B. & W. corn would make the same growth in New Hampshire that it would in Wisconsin or Iowa?

MR. SMITH.—I only judge from the growth it did make.

MR. GOULD.—I want to speak a word about that New Hampshire experiment. The B. & W. corn was planted at the time the little Yankee corn was, and at the time the silos were filled the Yankee corn was quite mature, while the B. & W. corn was just nicely tasseled out. If the B. & W. corn had had the growth and maturity of the next thirty days, I think the results would have been the other way. The New Hampshire climate did not give it time to put in its full maturity, and it was putting the fully matured Yankee corn against the half matured B. & W. corn. We have found that the common dent corn was perhaps three or four weeks ahead of the ensilage corn.

MR. JONES.—I have no doubt this B. & W. corn is all right if you want to use it in the silo, but here in this country I believe that the smaller kind of dent corn is the safest for the general farmer.

EXPERIENCE WITH FODDER CORN AND THE SILO.

By HIRAM SMITH, Sheboygan County, Wis.

Third Paper.

Important Discoveries.—I am called up here to talk about the silo. An empty silo is no better than an empty pocket book. Therefore, I will go back a little to the commencement, to find out what we want to raise to put into the silo. A few years ago, some enterprising men found out that the large Southern sweet corn contained more feeding value and was the best fodder plant to grow that had been discovered; that it was actually producing more to the acre than any other forage plant known to the agriculturist. Following soon after upon this discovery, another class of men found out that this large, excellent crop could be preserved in the silo in its greatest perfection. These two important discoveries mark a new era in agricultural development; they bear the same relation to those engaged in animal industry as the invention of steam power applied to navigation on the water, locomotion on land and to the thousand industrial manufactures in the cities and towns. They make it possible for the farmer to make the same advance.

Value of the Silo.—This question has been discussed more earnestly through our state the past year than any other question which has been presented to the farmer in any period since our history began. It is the one absorbing question in nearly all the farmers' institutes that have been held, and if the institutes that have recommended and advertised these two methods of proceeding to gain our fodder for our cattle, have done nothing more than to bring fodder corn and the silo before the people of this state, they have earned the money it has cost four times over This we shall soon find out. You may think it is radical talk to-day, but the time is fast approaching when the farmers will see the necessity of acting in this matter. A German farmer came to me one day (and he has a pretty large lot of stock, and a pretty limited supply of fodder); he looked over the silo, and the cattle that had been fed from it, and after he had about concluded his investigations, I asked him if he intended to build a silo. "——, I got to" he said. There's no question about it; he couldn't get along without it any longer. He had had to sell off one-third of his stock this year, and another drouth would have taken another third, and it was a matter of necessity. Now, this question has been discussed in the institutes, and I am proud and glad of it, and the inquiry still continues both in the institutes and outside of them. Owners of silos are flooded with correspondence from all over the Northwest; nearly every owner of a silo is visited almost daily; farmers come five, ten and twenty miles, come singly and in couples, and sometimes in platoons, in short, farmers are flocking to the silo like pilgrims to the Holy Land.

$400,000 Expended for Feed.—Now, what I have to say will be from my own experience. One remark more I will make. This grand awakening among the farmers of the state has come none too soon. There are single counties in this state, and I think Dane is among the number, where over four hundred thousand dollars have been paid out for cattle feed, outside of the counties—a greater sum than the entire state tax for 1884, for the support of schools, including the mill tax, the tax for the support of the university, for the insane asylums, and for the industrial school for boys. It needs no shrewd political economist to foresee that such a system of farming leads to impoverishment, and if there is a way out, we are all desirous to find it.

Kinds Fodder Corn Planted.—Forty acres of corn were raised, consisting of the following varieties:

Burrell and Whitman, (B. & W.)	22 acres.
Southern Sweet, (Sheep-tooth),	7 acres.
Wisconsin White Dent	7 acres.
Stowell's Evergreen Sweet	4 acres.

Feeding the Fodder and Ensilage.—Feeding commenced for soiling 25 cows and heifers on the 27th of July; 2½ tons per day were fed for 111 days, amounting to 277 tons. There were put into the silo, in Sept., 250 tons, and the rest of the crop in shocks, 129 tons. Total, about 656 tons, or an average of 16 tons per acre. The silo was opened Dec. 1st, and 30 lbs. of ensilage was fed to each of the 90 cows, for the night's feed, or 2,700 lbs. per day, until March 10th, 100 days, or a total of 135 tons, leaving sufficient ensilage to last until May 10th. The 30 lbs. of ensilage took and well filled the place of 10 lbs. of good hay. Had hay been fed for the night's feed in place of the ensilage, it would have required 900 lbs. per day for the 90 cows, or a total, for the 100 days, of 45 tons.

It would have required, in the year 1887, 45 acres of meadow to have produced the hay, which if bought or sold, would have amounted to $14 per acre. The 135 tons of ensilage were produced on 8½ acres of land, and had a feeding value, as compared with hay, of $74.11 per acre.

The Daily Ration.—The morning ration for each cow during the winter has been as follows: At 5 A. M. each cow was fed 2 lbs of uncut hay, mainly for the purpose of having the cows get up ready for milking; after milking, dry corn fodder and barley straw, mixed and cut ½ inch lengths, making a ration of

Hay	2 lbs.
Corn fodder	6 lbs.
Barley straw	2 lbs.
Corn and Oats, ground	3 lbs.

For the evening ration, we fed

Ensilage	30 lbs.
Wheat middlings	3 lbs.

This daily ration would be insufficient without the development of ears of corn in the ensilage and in the fodder corn. Two years' experience goes far to convince me that 2½ tons of ensilage made from sweet-corn with roasting ears developed, is fully equal in feeding value to one ton of hay, and is greatly to be preferred for milk cows, calves, brood sows and shoats.

Silos Save Expense.—Experience confirms the opinion, that the full feeding value of a nearly matured corn crop can be saved with less waste in the silo than by any other method yet known, and the entire expense of husking, shelling, and grinding saved (not less than one fourth of the expense of the crop), and it is in better condition for feeding from the silo, than it is after the separation has been made. Ensilage corn standing 12 to 14 feet high is difficult to shock, impossible to stack, and impracticable to save in the barn. If left in the field, it is in the way of fall plowing which good farming demands, and if removed from the field and put up in ricks, it requires more labor than to put in the silo.

Cost of Ensiloing Corn.—The actual cost of raising and getting a corn crop into a silo, is often greatly overestimated. The common dairy farmer usually has all the men, teams, and tools required to handle a corn crop for the silo, and the only legitimate charge is the wages paid the men who are doing the work. The men on a dairy farm earn their board milking twice a day, and the team's expense is no more or less, on account of the silo. What then is the cost of ensilage per acre or for 40 acres? One man and team will plow 40 acres in the fall in 26 working days; wages $18. Two men and two teams, will, in the spring, cultivate and prepare the ground, plant with the horse drill, run the smoothing harrows, and cultivators until June 15th, equal to five months work, at $18 per month, $90. Eight men will cut in the field, haul to the silo, run through the feed cutter and pack in the silo, 23 tons per day or more, at an expense of $7.10 per day. To recapitulate:

Plowing 40 acres	$18.00
Plowing and cultivating	90.60
Cutting in the field and ensiloing 656 tons.	288.64
Seed corn 50 cents per acre	20.00
Total money expense	$416.64

This is equal to $10.41 per acre, or 69½ c. per ton. If to this were added, use and keep of horses, $125; interest at 6 per cent. on 40 acres at $80 per acre, $192; the use and wear of machinery, $25; entire cost of production would reach $758.64, or $1.15½ per ton. What then is the conclusion of the whole matter? Simply this: That 3 cows can be wintered 7 months on one acre producing 16 tons of ensilage, while it required 2 acres of meadow in the same year, 1887, to winter one cow with the same amount of ground feed in both cases. It may justly be said that one ton of hay per acre is a light crop, and is often doubled. Sixteen tons of ensilage is not a large crop; 24 tons are often obtained.

Preserving Fodder Corn.—Many columns and pages have been written, to prove that dry fodder corn is equally as good out of the silo as in it; that ensilage has no more nutriment than it had before going into the silo. These statements hardly settle the case. We do not put corn into the silo to gain nutriment, but to preserve from waste the nutriment already in it. The same argument might be used with equal force in the case of firewood. There is no more carbon in the wood when it comes out of the wood-house than when it went in, but it is in better condition to use, and no waste incurred. Each man will have to decide for himself his own method of preserving fodder corn. The great advantage to be gained in raising fodder corn does not entirely depend on the silo. The crop is a great good in itself, however preserved. Experience and observation will eventually settle, as it settles all other questions, the most economical method of its preservation.

Southern Corn—Putting in Silo.—There has been something said here about the Southern ensilage corn. My observation of it has been that it will prosper in almost all varieties of soil; that it will sufficiently mature for ensilage in almost all latitudes. We can tamper with it a few years and waste some little time in mixing the varieties. I have grown the B. & W. corn for seven or eight years, and never had a failure no matter what the season was. We can also waste some time in experimenting with putting in the ensilage whole. If a man has no feed cutter or power, he can put it in whole and get good results, and he can get better results if he has a second crop of clover to tramp in, in connection with the corn, as it lessens the air spaces and helps the preservation of the corn; but he will find it unpleasant to handle when he comes to take it out, because it is ten or twelve feet long, if it is the proper kind of a crop. The cheapest way is to run it through a feed cutter. It can be done with a carrier, 22 or 26 feet, cheaper than any man can unload with the horse fork, and put into the silo quicker and easier than we can set it up in shocks, because the butts have to be straightened and set together. We have tried it and found that it takes seven or eight minutes longer to set it in the shock than to run it through the feed cutter. The work has been so simplified that it seems to me a farm of any size needs all the appliances required to cultivate and take care of the corn crop. No dry feed can be fed with the same economy as if it were run through the cutter; and so we shall learn step by step, lessening the labor and increasing the benefits of the crops we are raising.

Discussion.

PRES. W. I. CHAMBERLAIN.—What machine do you use to cut your corn?

MR. SMITH.—The best machine that I thought I could get. There are a dozen good ones. For the gentleman's private information, I will say, that I am using the one made in Manitowoc. I use sweep power.

MR. GATES.—Suppose we had a little shower after the corn is ready to put in the silo.

MR. SMITH.—Well, it does not very materially injure it. There would be a little more acidity in the feed; it would keep equally as well. If there was a frost threatening, I would not hesitate a moment. If it had already got frosted, I would put it into the silo and let it heat up. It is the drying up after the frost where the great injury is done to corn and if it was frosted, I would work night and day to get it into the silo.

MR. HOARD.—Will you state your experience with B. & W. corn and Sheep-tooth?

MR. SMITH.—The only objection I have to Sheep-tooth is the want of size. I raise fodder corn to get the most out of it that I can. We have been raising that small corn for twenty or thirty years and did not get very rich on it. Now, there is a better kind come, and still our old prejudices incline us to object to it, and to stand by this little corn that we have had. I don't want any corn that will mature in this country; it has not got vitality, it is not quite equal to the other. As to size, the Sheep-tooth I planted this year was about three quarters of a crop, the Evergreen sweet corn was less than half a crop, while the Southern corn can be depended upon for a big crop no matter what the season is. When we get potatoes we like them about as large as they grow. I am not a small potato man; I want big potatoes and I want big corn.

QUESTION.—What is the difference in the season of the Sheeptooth and the B. & W.?

MR. SMITH.—I don't know; that has got to be determined at the Experiment Station, by very patient aud long work, but it is somewhere about ten days. I don't know now whether the corn that does not mature may not have all the nutriment above the ground. I do not know but all the feeding value that ever will get into the stalk is already there. I think when the lower leaves begin to turn yellow, you get no more nutriment in the stalk or in the ear.

MR. BROWN.—I think I have heard you reported, by a seed man, as saying that you preferred Sheep-tooth to B. & W.

MR. SMITH.—I am glad you spoke of that. I hope that man is here. He issued a circular purporting to quote a letter of mine, to the effect that I preferred Sheep-tooth corn as the very best corn for ensilage. As soon as I read that circular I wrote to him and asked him to show me where I ever wrote a letter to him containing the quotation reported in the circular. He wrote back that he had no such letter, and he said a few other things that he understood in a conversation. He was at my house in the summer, when the crops were growing, and I didn't know anything about it. He knew I didn't know anything about whether it was good or bad, and he claimed that I said then that it was going to be the best. That accounts for the circular, and that is how I have been misrepresented. On the strength of that conversation he put it into his circular, to sell his corn.

MR. BARLOW.—Do you use your ensilage cutter for cutting dry corn stalks?

MR. SMITH.—Yes, we use it through the winter, one day in the week. The ears being unripe, the corn froze perfectly solid, and we cut it once a week and allowed it to heat up, on the long barn floor before feeding, and it would heat up and become quite hot, sometimes so that we had to pitch it over.

MR. HOARD.—How do you cut your corn in the field?

MR. SMITH.—Well, I feel somewhat as Mr. Chamberlain does about sweep rakes. I got one and tried it. I could run it until I broke it; it had to give way. I don't say it is impossible to cut corn with a sweep rake reaper, but it is simply impracticable with a crop that is big enough. Therefore, I cut it by hand and lay it in gavels. A sweep rake reaper scatters it badly; it needs a man to go behind the reaper. One man can't do anything there alone, any more than he can running a political campaign alone. We cut it by hand and lay it nicely in gavels to let it wilt one or two or three days; four or five days can't hurt it, if the weather is fair. We then draw it with two trucks and one wagon and one team. One man stays in the field to load his own truck, and another man has gone to the barn with a load and he finds a man at the machine unloading it. Each man keeps his own truck. The horses are changed and we never unload a load except as it goes to the platform, and so through the feed cutter. Then we cut into one inch lengths. In cutting dry fodder, I cut half-inch lengths.

MR. CADWALLDER.—Would it do to fill a silo in one day? Every farmer may not be able to own his feed cutter and horse power, and a number might join together and use them a day at a time.

MR. SMITH.—It would take a good many men to do it in a day. The best way is to put about three feet in in one day, and we therefore make small pits.

SILO AND ENSILAGE EXPERIENCE.

By CHAS. R. BEACH, Walworth County, Wis.

Fourth Paper.

Why I Built a Silo.—We rarely adopt improved methods except as we are compelled to by our necessities. It was the drouth of last summer (1887) that forced me to build a silo. After I had harvested my hay crop, I found that I must either sell my cows or make some provision out of the ordinary line. I had fourteen acres of fodder corn planted upon low, rich land that had stood the drouth well, and promised to be a fair average crop. I first visited the farm of H. S. Weeks, Oconomowoc. He had sixty head of cattle, but no hay; had twenty-five acres of B. & W. corn and a silo. He said that he was not troubled about the drouth, that he could winter his cattle. I next visited the farm of Oalmon Bros., Dundee, Ill., who claim to have kept 125 cows on 205 acres of land, and sold hay. It was the first week in August, and the drouth was fearful. I found them feeding their cows on the last year's ensilage and bran. They had fifty acres of B. & W. corn; said they had no fears about feed for the winter. With such testimony, I came home fully resolved to build a silo.

How I Built My Silo.—My silo is twenty-four feet long by twenty-two feet wide, and eighteen feet high. It is built at the end of a bank barn, lapping eight feet against the barn; fourteen feet are against the bank. The bottom of the silo is on a level with the bottom of the basement of the barn, with which it it is connected by a door through which the ensilage is wheeled to the feeding mangers. The silo is built of wood, upon a wall on the side two feet high in which are set posts four to five feet apart, the tops of which are on a level with the top of the wall. On the bank side the wall is seven feet high. The sills of the building are of two-inch plank, one foot wide, held in place by spiking them to the tops of the posts in the wall. The studding is of plank, one foot wide, placed thirty-two inches apart (the width of building paper). The plates are of plank, one foot wide, and mortised to the top of the studding. The building is kept from spreading at the top by false rafters, spiked to the plate and the regular rafters, reaching across to the opposite rafter, two feet below the peak and securely fastened. The building is covered on the outside with paper tacked to the studding, and then with lap siding. On the inside it is papered; then furrowed out with inch strips, then sealed with good matched sheeting. The roof is of the best shingles. A partition divides the silo into two compartments. The whole cost was $150.

Power—Cutter—Wagons.—We used a one horse level tread power, a thirteen inch feed cutter, with carrier fourteen feet long (as the cutter stood upon the bank eight feet above the bottom of the silo), and two truck wagons, upon which were placed fourteen feet racks. These racks were as high as the top of the wheels, but low enough for a man to load a ton or more from the ground without the help of a man on the wagon, by placing the corn crosswise of the rack.

Variety of Corn Planted.—Our fodder corn was eight rowed yellow flint (Yankey), planted with a two horse planter, rows four feet apart, hills one and one-half to two feet apart in the row with four to six stalks in the hill. Almost every stalk had an ear of corn, and would yield seventy-five to eighty bushels of ears to the acre.

Cutting the Corn.—The corn was most of it glazed, and all large enough for roasting when we commenced cutting, and we picked our seed before we finished. The cutting was done with a self rake champion reaper, cutting one row at a time, leaving the corn in gavels of a size easy to handle; could cut an acre in an hour cleaner and better than by any hand work. We cut on two sides of narrow strips, going round at the ends. When the weather was fine, we cut after supper what we expected to put in the next day, which was about an acre.

Filling the Silo.—One man, with a team and the two wagons, would bring from the field, one would take the corn from the wagon and place it on the table, one feed the cutter and one stand in the silo. Four men in all, would, in eight hours, put in an acre supposed to yield fifteen or sixteen tons. The ensilage was cut one inch in length. We cut into each of the two compartment every other day. After the silo was filled, which took three weeks as the weather was stormy, we let it settle four to five days, then filled again, and then covered with tarred paper, then boards and, after that, with seven to eight inches of hay weighted with a few planks and fence posts. It took ten and one-half acres of corn to fill the silo. It cost less money and labor to put in the corn, cut ready for feeding, than it would have cost to harvest it in the usual way of shocking, husking, or shocking and stacking without husking.

Feeding The Ensilage.—On the 19th of November, we took the covering from one compartment. We found the top, to the depth of two or three inches, black and slightly mouldy, but the cows ate it with apparent relish. We afterwards found spots near the corners, or at the extreme edges, in the same condition, but the cows have eaten it all. From the time we commenced feeding, up to March 28, I do not think there have been ten basketfuls wasted. The cows have eaten it clean; not only that, but the seventy-five or eighty bushels of ears of corn to the acre that were in the ensilage are so thoroughly digested that you can find none in the droppings. Had the same corn been fed in the shock, half as many hogs as you fed cows would have found their grain rations in the manure.

The Results.—Now for the results. We have been feeding this ensilage exclusively to cows from which we make butter—twenty-six in all—of which twenty-three gave milk for the whole time; one, part of the time, seventeen that came in since October and seven farrow and strippers. The daily rations for these cows have been from forty to fifty pounds of ensilage, twelve quarts of wheat bran and eight to ten pounds of hay, fed in two rations night and morning; no feeding in the middle of the day. The daily yield of butter has been twenty-seven and twenty eight pounds, requiring but eighteen to eighteen and one-half pounds of milk for a pound of butter. The butter has been sold for thirty-two cents per pound in Chicago, through a commission house.

After feeding the smallest compartment, which, being measured, was computed to hold four and one-half acres, we found that, after paying $120., the cost of the bran the cows had eaten, and $80, the estimated value of the hay fed, we had $460 and the skim milk for the four and one-half acres of the ensilage, and our work. We have been winter dairying for fourteen years, but we think that we have never before produced as much butter at so small a cost. We had fears about the quality of the butter, but the prices we received show conclusively that our fears were groundless. The cows have maintained their condition and we think improved in flesh, though yielding large quantities of milk and butter.

Pleased with the Silo.—This is my first experience with ensilage, and I may, in the future, change my opinion, but thus far it more than meets my expectation. I am more than pleased with it, I am enthusiastic over it. I think that a field of corn put into a silo at the proper time will yield one-half more feed than if handled and fed in the usual manner, and this, too, without any additional labor.

Some of Its Benefits.—Let me briefly sum up some of the benefits of a silo. All winter feed should be under cover, or it will damage and rust. The room required for a ton of hay, or a ton of corn fodder, will hold ten tons of ensilage. A silo can be built for less than a dollar a ton of its storage capacity. Your corn can be harvested at the time when it has the greatest feeding value, and it can be kept without waste and in the best possible condition for feeding. It can be handled at a less cost than any other known method of harvesting it. The cattle like it, will eat all of it without waste, and *thoroughly digest* it. Cows fed upon it give increased quantities of milk, the milk is rich and the butter is good. An acre of good fodder corn ensiloed will, with a fair daily feed of bran, more than keep a cow for a year.

Discussion.

MR. EDWARDS.—How do you cover your silo?

MR. BEACH.—We covered it more than we needed to, I think. We covered it first with paper, then with boards, then with about a foot of hay, and weighted the hay with planks. I think the boards might well be omitted, and perhaps the paper and probably the plank.

MR. NORTH.—I came from La Crosse here for the special purpose of getting posted on ensilage. Now, would you feed ensilage wholly, with nothing else from fall until grass again?

MR. BEACH.—No, nor nothing else that ever grew. Even grass at its best can be improved by a grain ration.

QUESTION.—How much would you consider a ration for a cow that would weigh 1100 pounds?

MR. BEACH.—Well, I don't make any difference between a little and a big cow. Sometimes a little cow will eat more and give more milk. A man has got to have some common sense if he keeps cows, and give them about what they will eat.

QUESTION.—When you changed to feeding ensilage, did you find any difference in the value of the milk?

MR. BEACH.—When we commenced, our cows were very fresh in milk and they have kept up the flow extremely well—better than I have ever known them to. Mine is a wooden silo above ground.

MR. NORTH.—In order to make enough for seventy head of cows, would you advise two or three pits?

MR. BEACH.—I see no reason why you need to get in over two. My silo has a bank on one side. I have only to lift ten feet. Of course, the further you lift, the more power you have to use in lifting.

MRS. BARLOW.—In lifting into a twenty-foot silo, we have to use a thirty-foot elevator.

MR. NORTH.—What was your experience last year compared with this, as to the amount of milk it took to make a pound of butter?

MR. BEACH.—It used to take about twenty pounds of milk for one pound of butter during the winter. This last year it has taken eighteen and a half, steady. My cows are mostly Jersey grades.

MR. GOULD.—What was your experience last winter in the feeding value of the stalks?

MR. BEACH.—I had the same land planted to this yellow flint corn last year. We put it up in shocks, and commenced feeding to about thirty cows, and we had it all fed out by the first of March.

MR. PUTNAM.—Would you raise a root crop as against ensilage?

MR. BEACH.—I was once asked if I would raise roots for cows; that was before the days of ensilage, and I then answered that I had a good wind-mill, and that I could pump water easier than I could raise it, on my land.

MR. GOODRICH.—I have fed cows thirty pounds, twice a day, and I will say that, if you will give them ensilage, they won't look at hay, and they will thrive on that alone.

MR. BEACH.—Let me say, roots have a great nutritive value, on account of the water that is in them, but the labor of raising roots above ensilage is so large that we can hardly mention them at the same time. I wish to say, in regard to ensilage as against the same amount of dry fodder, that when feeding shock corn in the same condition, I could keep about fifteen hogs behind thirty cows. Now it is not worth while to turn out the hogs; the ensilage is much more thoroughly digested, which gives it an increased value. It is stated upon authority that, even at its best, but sixty-six per cent. of dry corn is digestable, while ensilage is nearly all digestable, making it ten for ensilage and six for dry feed.

THE BEST CROP FOR ENSILAGE--ITS COST.

By GEO. A. AUSTIN, Clark County, Wis.

Fifth Paper.

Ensilage is Practical.—I can simply say that, from my experience with ensilage, I can confirm all the good things that have been said. It is practical for the large farmer, practical for the small farmer, practical for the rich farmer, and the poor farmer has no business to attempt to get along and keep stock without a silo. Of course, in speaking of ensilage, we speak of fodder corn as ensilage, not that it is the only crop that can be ensiloed, but because it is the important crop that we can raise the most conveniently and in the largest quantities. I have said that it doubles the feeding value of fodder corn to put it into the silo, and I want to be understood as qualifying that to this extent: While the silo adds nothing to the feeding value, it does preserve all the feeding value in the most economical manner possible, because it puts it in condition to be fed out to the stock at the least possible cost; because one man will do more toward feeding a herd of cattle from the silo than four or five men will from the hay mow — they will feed with less labor and in less time.

The Silo Saves Fodder.—Then I find this thing: That it is impossible for me to cure and preserve fodder corn in its perfect condition during the winter. If it is left out-of-doors it is constantly deteriorating in value, and I find it impossible to store it in the barn, so that it can be made to pay. Now, I give credit to the silo for saving this twenty to forty per cent. lost out in the field, and I say this alone is enough to give the silo all the benefit that is claimed for it in the saving of fodder at the least possible expenditure of its nutritive value.

Cost of Raising Southern Corn.—I was given, last season, charge of the business of finding out the cost of raising Southern corn. I opened an account with the corn field, and I will give you the results briefly. I kept an account with a man and team at $1. each. I did not charge anything for the board of the man, because a man milking from ten to twelve cows night and morning will pay for his board very well. I found the expense of plowing, seeding, cultivating the corn, and getting it ready to go into silo, was $4.50 an acre. From the time I commenced cutting it for the silo, it cost me forty cents and four mills a ton, to cut it and put it in the silo, counting a man at $1. a day, and a team at $1. a day. I drew it to the scales and weighed it. My ensilage corn was all Southern corn, called B. & W., and it averaged 19 and 47-100 tons per acre, after being wilted three or four days. When it was wilted one or two days, it weighed twenty-one tons to the acre, by actual weight, so that I think the crop, if cut and drawn green from the field, would have weighed from 25 to 28 tons to the acre; many of my friends put it at about 30 tons. I frequently found stalks weighing nine pounds, which, after standing two days, weighed about six.

Cost of Ensilage in the Pit.—The cost of my ensilage in the pit was one dollar a ton. The way I account for the variation between myself and Mr. Smith, of fifteen cents, is that he put in corn that did not weigh as much to the acre. Fifty pounds of ensilage is as good for my cows as twenty-five pounds of hay. I get as good results and, in considering that, you must bear in mind that the ensilage has been somewhat dried out.

Southern vs. Northern Corn.—I was a little like the rest of the farmers, somewhat conservative. I did not like to admit that there was anything better than Northern corn. I planted a little of the Northern varieties last summer (1887), and I had to do as the rest of us did, go into the field and cut it and feed the cows during the summer, but I cut and put into a silo about eight acres of that small corn. I did not weigh it; I don't think there were five tons to the acre, and it succumbed to the drouth and was considerably less than half a crop, while the other was a good full crop of twenty-five tons to the acre after being wilted. Now, I found a large shrinkage in the milk when I came to feed that Northern corn; it did not give as much milk as the Southern corn. I had no difficulty in getting the Southern corn to ear heavily. I did not commence cutting until late; I waited until it did ear, every stalk having a well-matured ear, and many of them two. I really think that on that corn planted early, I had as many bushels of ears of corn as on any variety of corn that I have ever planted.

Discussion

MR. NORTH.—How did you plant your ensilage corn?

MR. AUSTIN.—I planted it in drills. Dropped it in rows, three feet eight inches apart, three kernels twenty inches apart in the row.

THREE YEARS' EXPERIENCE WITH SILOS.

By H. S. WEEKS, Waukesha County, Wis.

Sixth Paper.

Fodder Corn and Drouth.—My own experience with the silos built on my farm in 1880, covers but three years, each of which has been one of climatic extremes, when all farm crops in this region have suffered more or less. You all remember the season of 1885, with its exceptional rainfall, whereby all vegtable production was watery and immature, and had to be harvested under most adverse circumstances. My fodder corn, however, attained an enormous growth, and was a great success, as we then were accustomed to fill our silos. It was succulent, surely, but that was the main object in view, and, if it required more grain food to supplant its use, that was to be had cheap enough. The next year of extreme heat and drouth, the season of 1886, you also have not forgotten. Grain and forage crops, as a rule, were a partial failure, and my fodder crop was a light one, as compared with the previous year, and did not entirely fill my silos; but in feeding qualities it produced the best I have had.

Success With Southern Corn.—I planted the Southern ensilage corn entirely, and got it in late, say the 10th of June. The ground was well manured, the crop well cultivated, and, though it grew slowly at first, yet it attained a good height, was well eared and reached a good stage of maturity early in September. It was cut and put into the silo without wilting, and much more rapidly than is the rule now, but when opened it was a splendid feed, of a rich and sugary smell and taste, a little of it going farther than double the amount the year before.

Interesting Experience.—The summer of 1887, with its unprecedented drouth and heat, covering almost the entire growing season, is fresh in the minds of everyone. My Southern corn, planted about the middle of May, on land heavily top-dressed with manure, thoroughly worked in and pulverized with the disc harrow, the seed bed being made as fine and mellow as a garden, was doing finely and promising a large yield until stricken by the memorable wind storm of August 9th, which broke the drouth, and at the same time broke down my tall ensilage corn. It looked like a pile of jack-straws, and required about as much skill to cut and pick up as is necessary in that boyhood game. I saw no way but to put it into the silo, if I would save it, though it had not yet reached the proper stage, the ears being hardly formed. I cut and put in large stooks, thinking thus to improve it for ensiloing, but, considering the torrid atmosphere in which it was grown, many leaves being curled up and withered, I am doubtful if it was the part of wisdom. I find the ensilage thus made, in the bottom of my silos, much inferior to that put in later from Northern corn, well eared. I was obliged to fill my silos very slowly, owing to the time required for the fodder to heat to the proper degree for making strictly sweet ensilage, and that was my objective point, that year, at all hazards. It was accomplished, and, though not all as perfect ensilage as I could have wished, yet it furnished me with feed for fifty head during the winter, and all from the product of about 18 acres.

The Silo in Time of Drouth.—In giving you, briefly, the history of my three years' experience with the silo, I wish again to call your attention to the fact, which I at first stated, viz: These have all been seasons of more or less disaster to farm crops, the last one more especially, when hay proved almost a total failure, thereby compelling so many farmers to part with valuable stock for "a song," entailing untold losses, present and prospective. How has it been with those who have depended upon the silo to feed their cattle? Take my own case as an example. I have pursued the even tenor of my way, regardless of flood or drouth, sure that by this system I should have feed enough and to spare, and have not turned my stock out to pasture until June 1, either year.

Lessons From Experience.—Some of the lessons which my experience has taught me are: First that it is wise to plant a part of the Southern ensilage corn and part of some acclimated Northern variety, because, in our varying seasons, we are surer of the Northern corn reaching maturity. If planted early, and the season is favorable, the Southern corn will mature ears to the partially glazed stage before frost. On the other hand if anything prevents early planting, and the season is wet and cold, it will not reach that condition. Most of you, whose experience with the silo has been obtained during the past two years of abnormal heat and drouth, do not realize this. There is no season in this latitude when the Northern corn will not mature sufficiently to make the best ensilage. Another point which my experience suggests is, that if the crop is well matured when properly put in the silo, and protected from the air till used, it will make equally good feed if it is not heated to the point which makes what we term "sweet ensilage," meaning by that almost entire absense of acidity in taste and smell. I would not have you infer from this that I would go back to the ensilage as first introduced, which was sometimes not inaptly called "*sour krout*," and in which water was the larger part—far from it. But it seems to me that a middle course answers well. Under some conditions, it is inconvenient and more costly to fill the silo as slowly as is required to make strictly sweet ensilage, which I can not discover that cattle eat with any more relish, or with any better result, than that *slightly* acid. The nature of the season and the condition of the fodder should govern somewhat in this matter.

The Silo in Farm Economy.—I believe the silo is destined to play a very important part in the farm economy of the future; that it will be utilized to preserve all our forage crops, not only for winter, but for year around feeding, and that the days of pasturing on high priced land are substantially numbered. We have got to face low prices for all farm products, and, as with the manufacturer, so with the farmer, the only way to meet it is to cheapen production. The silo opens the way for the dairyman and stock feeder.

THE SILO IN EAU CLAIRE COUNTY.

By S. E. COOLIDGE, Eau Claire County, Wis.

Seventh Paper.

How I Planted the Corn.—My attention was first called to this subject by Mr. W. D. Hoard, in the spring of 1886. He came to our place (Augusta, Wis.), and gave us a lecture on the advantages of fodder corn over field corn, for feeding stock. Acting on his advice, I procured two sacks of the B. & W. seed corn, and planted six acres; used as near as I could ⅛ bu. of seed to the acre. I used a Rockford planter and planted in drills, 3 ft., 10 inches apart. I dragged the ground until the corn was about six inches high; then cultivated it three times with a two horse sulky cultivator. The corn grew to an enormous height, and was so thick on the ground that a man could scarcely walk through it. In August we had a storm that blew it down badly; after this the tops of the corn turned up, which made the stalks very crooked, and this made it very hard to shock.

My First Silo.—I wrote to Hon. Hiram Smith to send me a plan for a cheap silo that would hold 100 tons, and his method of filling the same. He sent me a plan by which I built my first silo. It was 16 ft. square and 16 ft. high, and cost me something less than $50, including both labor and material. I only built three sides, as I used my new barn for one side.

Filling and Feeding.—We cut and put into this silo 3½ acres of the fodder corn, according to directions. I covered with tarred paper and boards and then put on about six inches of clay loam. We opened this pit the first of December, and, with the exception of a little in the corners and around the sides, the cattle ate it with a good relish and did well on the two feeds a day of ensilage, and one of hay, with what warm water they wanted to drink.

I fed no grain except to milch cows; think I fed about 50 head for 90 days from this one pit. There were no ears on the corn; it was planted too thick for ears to grow. I was so well pleased with the results, that last year I planted twelve acres of the same kind of feed. I planted on part of the field 12 qts. to the acre, and 10 qts. on the rest of the field. The corn was all well eared and good roasting ears when I put it into the silo. I was best satisfied with that part where I used the most seed; it was the best eared and the best matured. During the severe drouth of August, we fed out two acres of this corn to our milch cows with good results.

My Second Silo.—I built another silo 18 by 32 ft., and put a partition through the center, making two pits 16 by 18 ft. each, and 16 ft. high. Into these three pits I put ten acres of our fodder corn. We covered our pits with tarred paper and boards, and over these put marsh hay.

Difficulties Encountered. — We opened our first pit October 28; found the ensilage good up to the paper, but the same difficulty we had last year vis: Some in the corners was spoiled. We fed 63 head of cattle for 60 days from this pit, with one feed of hay each day. On the first day of January we opened another pit, and fed 60 days, with one feed of cornstalks each day. March first we opened our third and last pit, and found it badly damaged; in fact it was entirely spoiled all around the corners and sides. My silo is two thickness of boards on inside studding and tarred paper between, well lapped. Sided on the outside with drop siding, except the last pit, which had no siding on two sides, one being next to the barn and the other next to another pit.

But it was spoiled on these two sides just as badly as it was on the two outsides. This part of my experience is not very satisfactory. If any one has had a like experience, and has discovered the cause of this damage around the sides and corners, I would like to know if he has discovered the remedy and what can be done to obviate this great loss.

Cheapest and Best Feed.—Even with this loss, I consider it the cheapest and best feed that I have ever fed to cattle. They prefer it to the best hay. No grain was fed except to our milch cows; they gave as much milk with the extra feed of cornstalks as they did when they were fed hay. My stock has all done well on this feed, and some of my dry cows are getting fat, so much so that I have sold five for beef in the last month. Horses like it, and hogs will eat it.

Discussion.

MR. NORTH.—I would like to ask if anyone has ever built a silo and plastered it inside?

MR. GOULD.—Yes; they are very common, but not as good as a silo built of two thicknesses of boards, painted with coal-tar and rosin on the inside. The plastering is of no advantage, and much more expensive.

MR. GATES.—What proportion of rosin?

MR. GOULD.—You will have to guess at that. A lump as big as your head, in four or five gallons.

MR. GATES.—Do you know anything about this loss in the corners?

MR. GOULD.—The whole trouble of the molding along the side and the corners, comes from the fact that we tread it so hard that it does not heat up as fast as in the body of the pit. The remedy is to tread it a little in the corners and leave it at night heaped up right in the center. The third day, when we get ready to fill again, throw this corn from the middle into the corners; that does away with the whole bother. Have your carrier carry as near the center of your pit as you can, and distribute through the day, and then the last three or four loads heap in the center.

QUESTION.—Don't you tramp down the corners at all?

MR. GOULD.—Not as much as we used to; we tramped it too much, and it pressed out the air so it did not heap up as well. You want to tramp it when you fill again, after it settles.

MR. AMES.—How are you going to cover your ensilage next year, Mr. Gould?

MR. GOULD.—After the experience I had last fall, I shall abandon the tarred paper and the boards wholly next year. After filling the silo and leveling it off nicely, I shall leave it until the ensilage shows 125 or 130 degrees. Then I shall simply put on a load or two of marsh hay, or wilted hay—anything of that kind—tramp it down, tuck it down on the sides and throw on a few old boards. Now, the heat coming up with this light weight, will mat it together on top and keep the air out.

MR. HIRAM SMITH.—The first silo I filled, I put on plank and weighted it heavily with stone, pretty heavy business. The next year I put on tarred paper and boards. We found that the question of weight cuts no more figure than it does in the wood pile. Last year I simply put tarred paper on the ensilage corn. Then I had a stack of corn I wanted to save through the winter. I ran it through the feed cutter because I could do it cheaper than to put it up with the fork, and put it on top of the paper and it was all that was necessary to cover it. The ensilage was perfect, right up to the sides. The paper makes good fuel to heat the water in the winter for the cows.

MR. GOULD.—I want to ask Prof. Henry one question: From the present status of the ensilage question, shall we abandon that and go back to the old way of curing our fodder corn?

PROF. HENRY.—I do not think I would be wise or politic to stand up here and face the experience of so many successful farmers upon a successful method. Some one has said, I don't know but that John Gould, when a professor and a cow differed, would go with the cow, and he was right. Science is simply the unfolding of truth, and the road is often long and tedious. Sometimes the practical man gets there long before the scientific investigator, and the farmers have found out more about the silo than the experiment stations, simply because the experiment stations have had one or two silos while the farmers have had hundreds. We, at the Experiment Station, believe in ensilage as an adjunct to the dairy. A farmer who feeds a steer has no use for a silo, It is the grand fodder crop that makes the silo what it is. If you haven't a large crop to feed, you can't have ensilage or fodder either. Plant some kind of Indian corn and you will not be very far from the truth. Remember our results have largely come from two dry years, and a difference in circumstances may make considerable difference in results in the future.

ENSILAGE FOR FATTENING CATTLE.

By C. V. GUY, St. Croix County, Wis.

Eighth Paper.

Cost of the Ration With Hay.—As these gentlemen have nearly all talked about the advantages of ensilage as a feed for milch cows, and have largely exhausted that subject, and a good share of my thunder also, I shall be obliged to confine myself to my experience with ensilage in the matter of fattening steers. Last winter I turned over forty-six head, I think, of fat steers, and, in order that you may have the better idea of what I may say in regard to this matter of feeding, I will give you briefly what it cost me last year to feed my steers from the time that I put them up until I sold them. The daily ration for them was 16 lbs. of hay at $8 a ton, 8 lbs. of corn stalks at $4 a ton, 6 lbs. corn meal at $12 a ton, 3 lbs. of ground oats at $68 a ton, 4 lbs. bran at 40 cents a hundred, making a daily ration at a cost of fifteen cents and four mills, as I figure it.

The Profit.—That there was any money in feeding cattle that way, is problematical, slightly so at any rate, but in order to make my two ends meet, I bought the cattle early in the fall; I had considerable fall feed and they did very well for a month or two on that, so that the expense of feeding them for that time was not over twenty-five cents a week. After that it was some fifteen cents a day. Any one knows that it would be entirely impracticable to make fifteen cents a day on beef, but in the fall I bought the steers for about two and a half cents a pound, or a little less. I commenced feeding some grain about the 25th of November, and, during the feeding of that, they had made about one and one-half pounds a day. The subsequent one hundred days feeding, at fifteen cents a day, would be $15. Buying them at two and a half cents a pound and selling them for four cents made the steer that cost me originally $25, sell for $25 plus the increase in weight of the steer at four cents a pound, and the one and one-half cents a pound for its original weight, made me about a dollar apiece for feeding my cattle and selling my provender, making a sale of the coarse feed or roughage during the winter.

About My Silo.—I want to speak about my silo. First, as to the amount of corn planted to the acre, I notice some are recommending as high as fourteen quarts. I found the best results from six quarts. I did not want to plant it any thicker than necessary to get a good supply of ears, and I had more stalks with three ears on the stalk, B. & W. corn, than there were without any. I think I got very much richer feed from this mature corn than if I had planted it thick. I figured out, last spring, the amount of seed to an acre, and found that, by putting four kernels to the hill, it would take four quarts to the acre, and the B. & W. corn being considerably larger than our native corn, made about six quarts, or about one kernel in a foot, planted three feet ten inches one way, and four kernels in a foot the other way.

Building.—One word about building the silo. If any of you propose building, be sure and get it strong enough. Some of my neighbors have failed because they did not put material enough into the the walls of the building. I put in two by eight scantlin, sixteen inches, sixteen feet high; if you put in less than that, I am afraid you will make a failure. As a general rule, make your silo strong enough to hold when filled with wheat to the very top; then I think you are safe. Another word, as to the partition between the two bins of the silo. One of my neighbors thought that when he filled the silo and got it pressed down, it would stay put like a bed of hay. Consequently he put a thin partition between the two bins, and when he came to take out of one side, the pressure of that remaining forced his partition out, and he lost heavily. Another point: Do not bunch your corn up in gavels when you cut it. Let it lay down one row at a time, and dry out thin; you will find it works better. The better the corn is wilted the better ensilage it makes.

Cost.—My silo cost me something like a dollar a ton. If you will build a large silo, holding over two hundred and fifty tons, it will not cost as much. I would not advise any man to put in a silo as small as fifty tons. When you come to figure up the expense, the necessary strength of the walls, and all other considerations, the proportionate cost to the square foot is very much larger in your small silo, as you will see.

The Ration With Ensilage.— Our feed of ensilage has been thirty-three pounds to the steer. They were just about as even a lot of steers as I ever had. Thirty-three pounds is just about a bushel, well packed down in a basket, and that is what they had every day, with five pounds of hay at $9 a ton, six pounds of corn fodder at $4 a ton, ground corn with the cobs, four pounds, at $10 a ton, and ground wheat screenings at $12 a ton, making a daily average of just ten cents, whereas last year it cost me fifteen and four-tenths cents. It is too early in the season to tell what the aggregate gain is, but I can simply say that the feeding is very satisfactory. There is another point: Last year I was feeding ground oats with my ground corn. For stock less than two years old, I think that would be a good ration, but for stock three years old that is going to be put on the market this spring, as far as I am at present informed in this matter, I am getting just as good results from grinding corn, cobs and all, as I was on ground shelled corn and oats. I think my steers are as fine as they were last winter.

Discussion.

MR. NORTH.— Suppose there are two farmers who have joined in filling their silos, using the same machinery, and a storm comes and catches one of them and it is two or three days before he can get to work again?

MR. GUY.— It will not hurt the ensilage; all you want is to let it settle and heat. You will find the ensilage will settle so that, when you come to go upon it, it will feel like ashes and sink under your feet. Tramp it down thoroughly, and it will do no harm. After it has begun to heat, tramp it down every day and you will be surprised to find how much it will settle. I consider it necessary to have it tramped thoroughly, and in filling a silo of seventeen or eighteen feet it will shrink four; if you keep the tramping down on top continued, I apprehend there will be no difficulty if you wait a week before you put on more. After it was tramped, the heating did not increase in mine.

MR. MCCREADY. — Did the ensilage seem to have any effect in the way of rotting the inside boards?

MR. GUY.—It has not yet. It swelled them up so it made them very tight. I put on such boards as I did in boarding the barn.

MR. MCCREADY.—Did you paint them?

MR. GUY.—No, I did not; I didn't have time. I think perhaps it might be better to put on a coat of paint, but they were nailed very strong, and I had no difficulty about their warping.

MR. KRAUSE.—If there comes a storm, which in our part of the country lasts sometimes a week, and the ensilage corn is left out in the rain during this time, will it go into the silo and come out all right?

MR. GUY.— If you let it get dry, and put it in dry, it will. If you put it in wet, I think it would burn.

MR. KRAUSE.—Then, you advise not to put it in unless it is dry?

MR. GUY.— Certainly not. I would rather haul it out and feed it to the cattle, if I had to do that, than lose it.

MR. GLEASON.—I would like to say one word to substantiate the speaker in regard to feeding his steers. I have had experience in feeding cattle ever since I was old enough to feed them, and always fed corn, ground up, cob and all, and consider it the cheapest food, and the best to feed to fattening steers in the winter.

MY EXPERIENCE WITH ENSILAGE.

By JOHN URQUHART, Columbia County, Wis.

Ninth Paper.

Canned Fodder.—My experience with ensilage for two seasons has been very satisfactory to me, and beneficial to my stock in having nature's natural green food to feed through the winter, and the stock appreciate that kind of food. We are advised at our institutes to raise and can fruit for our families, and I think it is good advice. In the silo we have a great canning institution, or factory for getting good and cheap food for our stock.

Possibilities of Ensilage.—The possibilities of this food in the present and future no man can tell. Just think of a man wintering his stock cheaper than he can pasture it in summer. Ensilage has revolutionized the dairy interest in Wisconsin, and the beef interest, too, so that we can almost compete in cheapness of food with the western ranche. I do not know of any other food so cheap that we could substitute for ensilage.

Forced to Build a Silo.—When I built my first silo, John Gould had not yet escaped from the stone silo in Ohio, to inform us how to make sweet and sour apple pies and sweet and sour ensilage. It is an old adage that necessity is the mother of invention. Necessity was the mother of my silo. If I had not been compelled by scarcity of feed, it is doubtful if I would have built a silo yet. No feed meant no milk, no butter, and you all know when a man has a herd of thoroughbred dairy cattle that would never do, for you must feed to make them give milk to make butter, whether crops grow or not. I never had seen a silo until I built one and filled it according to book instructions with field corn, nearly matured, and it made the best ensilage that I ever saw. I think forty lbs. of this ensilage was equal in feeding value to fifty lbs. of the ensilage I had this year. I have fed ensilage to cattle, horses, hogs and poultry, with the very best results.

How I Manage the Crop.—In planting ensilage corn, I use a horse planter. I put a boy on and he uses the lever nearly as fast as he can. I plant about eight quarts to the acre; this year I got about 25 tons of ensilage to the acre. I use a spring-tooth cultivator, and find it best for corn; use Belle City feed cutter, and it gives me the very best satisfaction. I draw corn to silo on trucks, with long reach, and wood or flat hay racks. I cut in gavels of about forty to fifty pounds each, with butts out from the standing corn. I drive team alongside of corn, then throw gavels on trucks. This saves walking up and down plank, so often, behind wagon as some recommend. I haul and cut about 30 tons per day, then let it heat up to 125 to 135,° filling one day and letting it rest until ensilage gets hot enough; keep filling in this way until the silo is full, then cover with tarred paper and straw. Be sure and have your silo air tight, and your ensilage will come out sweet and all right.

Cost Six Acres Ensilage.—I will give what the ensilage cost me per acre in the silo. The following figures are for six acres that I raised last season: Rent of six acres, at $4 per acre, $24; plowing six acres, at $1.25 per acre, $7.50; harrowing, three times, $3.75; planting, one half day, two men and team, $2; cultivating, four times, $7.50; making cost of growing and getting corn ready to cut, $47.30. It takes seven men and four teams to run cutter. Two men cutting and loading in field, $3; two men and two teams, drawing, $5; two teams and one man on power, $3.75; one man feeding, $1.50; one man spreading ensilage, $1.50; oil and incidentals, $1, making $15.25 per day for hauling, cutting and filling. Add interest on machinery, $10, and you have a total cost of growing, cutting and putting in silo, six acres, or 150 tons, $133.55, which will make your ensilage cost you 89c. per ton.

Fifty pounds per day is an average ration for a cow, with the usual meal ration; $4.05 will feed a cow ensilage for four months. It will cost $18 to feed a cow with hay for six months, leaving a balance of $13.95 in favor of ensilage, which is quite an item if you have 30 or 40 cows to winter.

I have filled one of my silos with ice this winter, making it do double duty. The silo has come to stay with me.

EXPERIENCE IN TAYLOR COUNTY.

By G. W. ADAMS, Taylor County, Wis.

Tenth Paper.

Cheap Forage.—My experience with the silo is only of one year's standing. While attending the farmers' institute held at Medford, during the early part of the winter of 1887, the question of cheap forage was discussed, and how best to preserve it so as to obtain the greatest feeding value for the time and money expended. With hay at from $10 to $20 per ton, it was out of the question with us farmers of Taylor County to think of keeping stock through the winter. In fact we did not like the idea of paying out so much money every year just for the pleasure of keeping stock. While listening to able discussions of cheap forage, and the silo as a means of preserving the crop in the best possible manner, I thought I saw an opening in the clouds, and the light of intelligent farming was being spread abroad in the land. The farmers of Taylor County had discussed the unprofitable business of keeping stock on hay, and many of them had concluded that it did not pay to keep stock when it required the hay from three to four acres to feed a cow through the winter.

Many of our farmers sell their cows in the fall for from $20 to $25 per head, and buy again in the spring, paying from $30 to $40 for the cow, letting her run in the woods all summer, costing nothing for feed. The farmer will receive from $15 to $20 in butter and milk during the summer from his cow, but it will cost $40, at the price of hay, to keep that same cow through the winter.

Now, what we need is a cheap ration to feed during the winter months, and this I believe the institute offers us, in the growing of corn, and in teaching us how best to preserve it in the silo.

My Corn Crop.—Last spring the question of seed corn was of great importance to me, and I finally concluded to plant the common white dent, which proved to be a great success. This I planted by hand, in rows, 3½ feet between the rows, and from 4 to 6 inches apart in the row. I commenced planting the corn about the 25th of May. This was at least a week too late, on account of the early frosts in the fall. I commenced cutting, to feed the stock, the middle of August, on account of the drouth. I fed the stalks whole. The cattle did not eat the stalks very well, and I think it was on account of the chinch bugs, which were quite numerous on the stalks at that time. The cows gave a slight increase in the flow of milk while being fed the whole corn.

My Silo.—My silo is constructed as follows: 26x24 feet, 14 feet posts, frame. Divided into two pits, 12x13 feet. Built on east end of hay barn. Used 2x8 studding, two thicknesses of common inch boards for outside, and one thickness of common boards and building paper on inside of studding, and filled in between studding with saw-dust, extending roof of barn over silo. Filled in with six inches of earth for floor.

Filling. — Commenced cutting, and filling silo, the 7th of September. Weather was not favorable; too much rain. Corn had commenced to dent when cutter was set in motion. The last planted was the first cut. This was unfortunate, as there was at least a week's difference in the time of planting, and six days' difference in the time of cutting, owing to location of the field and condition of the weather. I wish to call attention to this more particularly, as that part of the ensilage planted first and cut last, was superior to the other, planted last and cut first. I tried to cut corn and lay in heaps to wilt, but this method had to be abandoned, as it made too much work in spreading, when wet. Would cut corn for two days in each pit, and allow the ensilage to heat up to 120 degrees. As much as two-thirds of the field planted last, was cut and run into one pit.

The corn from 4½ acres of ground was cut into the silo, and completed the 17th day of September. A heavy frost on the 13th of September did some damage to the last corn cut, which was evidenced by small patches of mold in the ensilage in that part filled after the frost.

Farmers Incredulous. — The silo was left uncovered for a week, until it showed a heat of 130 degrees; then covered, first with tarred paper, and then with common inch boards. About two tons of old marsh hay were thrown on the top of the boards, and this well tramped. The silo was little more than half filled, and contained about 90 tons of ensilage. While filling the silo, hundreds of farmers and business men of Taylor County, and many from adjoining counties, visited the premises, and inspected the process of filling the silo. I was informed by a large majority of the visitors that I would have a large pile of manure to haul out of the silo in the spring; that unless I threw in lots of salt, it would not keep. Others would ask, if I knew what I was doing; that I was wasting my corn crop; that it was too bad to waste such a good crop, &c.

Opening the Pits.—I assure you, gentlemen, that it was with a great deal of uneasiness on my part that, on the 9th of November, I uncovered one-half the pit filled last. On the south end, about 6 inches of the top was moldy, but near the center of the pit there was not more than two inches of mold on the top.

A very little rot and mold on the outside, constituted all the waste in pit No. 1. The dry stock ate nearly all the moldy ensilage, so that the waste was almost nothing. On opening pit No. 1, thermometer showed 135 degrees. After remaining open some time, the heat grew less, so that the temperature remained at about 100 degrees. I fed from the top, and used one-half the ensilage in first pit. This was about the middle of December, and the weather was quite cold. In feeding ensilage from second half of pit, I did so by taking it out at the end, and placing a small prop under end of boards covering ensilage, to keep the cover from falling in. The ensilage remained fresh, and no danger from frost was experienced. January 15th I opened second pit. Temperature 140 degrees; from 6 to 8 inches of mold and rot on top; sides considerably rotted, and but little mold; ensilage more watery than first pit. All excepting the top and sides near the boards was good. At a fair estimate, there was three times as much loss in second pit opened as in the first. This I attribute to the corn being much greener when cut, and a few loads lying in heaps during a rain storm, and not thoroughly dry when put into the silo.

Effects of Feeding Ensilage.—At the time of opening the silo, I was milking eleven cows, all strippers except three. Owing to the drouth and short feed, they were not giving more than half their usual quantity of milk when in good feed. Within two weeks after I commenced feeding ensilage, the strippers increased their flow of milk one-third, and the other three increased one-half. This was a very pleasant surprise to me. I was giving each cow 4 lbs. of bran a day, at the time I commenced feeding, with what hay they would eat. The feed of bran continued the same while feeding ensilage. I feed to each milch cow per day 40 lbs. of ensilage in two feeds, morning and night, with 12 lbs. of marsh hay at noon. I have fed from this 4½ acres of corn, from November 9th to March 12th, 26 head of cattle as follows: 11 milch cows, 6 two year olds, 8 calves, and one three year old bull. The dry stock received nothing but ensilage during this time, except the old hay used in covering it.

What the Ensilage Cost.—The cost of this ensilage did not exceed $100, including rent of land at $5 per acre. As soon as the ensilage gave out, I doubled the feed of bran, giving 8 lbs. per day to each cow giving milk, and all the good timothy and clover hay she would eat up clean. During the four months while feeding ensilage, the cows giving milk were costing 3 3-5 cents for bran; 6 cts. for hay, and 2 2-9 cts. for ensilage; in round numbers, 12 cts. per day, each. Since the ensilage gave out, have been feeding my milch cows at the following cost: Bran 7 1-5 cts., and hay 26 1-4 cts.; in round numbers, 34 cts. per day each, or at an additional cost of 22 cts. per day.

I am now milking ten cows. This represents an additional cost of $2.20 a day. This does not represent all the loss, for since I have stopped feeding ensilage, the cows have been giving less milk, and it seems impossible to check the shrinkage of milk under the present method of feeding.

More Silos Will Be Built.—I am *more* than pleased with my experience with the silo and ensilage for the past year, and shall try to plant ten acres of corn for ensilage the present year. The farmers of Taylor County, who have visited my silo this winter, and witnessed some of the benefits growing out of the silo and ensilage, are warm in their praise of the good work being done by the institute workers for the farmers in Northern Wisconsin, and I do not doubt that a number of silos will be built in Taylor County, the present year.

EXPERIENCE IN WINNEBAGO COUNTY.

By W. B. VAN KIRK, Winnebago County, Wis.

Eleventh Paper.

How We Were Converted.—We were converted to the belief that the silo was a practical thing, at the institute held at Ripon last winter, under the preaching of Messrs. Gould and Austin. Prior to this time, we had thought of of it in a sort of vague way as something out of reach of the average farmer—something that might profitably be adopted by men of means who farmed it in a strictly scientific way, but not likely to pay the common farmers who are obliged to rustle for a living. It was, however, made plain to us there that any man of average intelligence whose credit was good for $100 worth of building material could build, and successfully operate, a silo, even without one cent of cash to put into the enterprise. We can think of nothing for which a farmer can better afford to run in debt. Acting upon this conviction, we tore up the floor of a bay in one end of the barn, reasoning that we could easily do without the room for hay, as the ensilage occupying the same space would go farther than the hay would. Setting heavy oak posts on the two sides of the basement not walled in, and laying scantling againt the wall, we commenced at the bottom and sheeted up to the plates of the barn with two courses of common boards, with tarred paper between, making a comparatively air-tight bin, 14½x29 feet, inside measurement, and 24 feet deep, capable of holding something over 200 tons of ensilage. It took seven thousand feet of lumber and studding, which, at $11 per thousand, cost us $77. Iron rods to strengthen barn beams, nails and building paper brought the expense up to not far from $95.

Building.—The work of building we boys did ourselves, and there is not the semblance of a mechanic among us either. It took us the greater part of a week to do it, although in all probability two good mechanics would have done it quicker. Perhaps we should have cemented the bottom, but we did not

A plank partition through the middle, dividing it into two pits, finished the structure and, getting the cutting machine and power in place, we proceeded to the filling.

Filling.—Thinking to be especially economical, we collected a lot of harvester chains, and made a carrier of our own. We managed to get through the season with it by dint of a good deal of fixing but concluded that, after all, it was not very good economy. We believe there is such a thing as squeezing a dollar harder than there is any kind of use in—until, as Mr. Louis expresses it, the eagle screams to the Godess of Liberty for protection. Every farmer has, or ought to have, business enough of his own, without entering into manufacturing.

Kind of Corn Raised.—We raised about 18 acres of the big Southern ensilage corn, that managed to weather the drouth and defy the chinch bugs. Not that the bugs did not tackle it, for it was alive with them, but it somehow managed to grow and thrive in spite of them while the native corn planted in the same field, shriveled up and died.

Method of Drawing.—Our method of drawing and filling the silo is not unlike that usually practiced. We find it pays to save lifting and carrying, so far as possible, for the stuff is heavy. Taking the wheels off an ordinary wide-wheeled farm wagon, we put them on the hind axle, and to this coupled the front trucks of the manure spreader. Putting a flat rack upon this, we had a low and convenient rig. We never tried walking up a cleated plank with our arms full of cornstalks. It may be easy enough, but it looks as though it would be up-hill business in more than one sense of the word. Our plan is to drive along by the side of a row of gavels—one man hands them up at the side while a second loads. In unloading we use a team with a tackle, rolling the entire load at once off on a rack or platform close to the cutter. Then, while one man is feeding the load through the machine, the wagon goes for another. Two loads per hour is the ordinary rate with us.

Time in Filling.—Doing almost the entire job ourselves, and at such times as it pleased us to work at it, it is hard to furnish any definite account of what it cost per ton to get it in, and more especially so as we have become so used of late to working for nothing and boarding ourselves. It was just about six weeks from the time we commenced until we put the cover on. We estimated, when we got through, that we had worked about half the time. For days we had it filled within a few feet of the top, but couldn't seem to make much headway, as the stuff settled about as fast as we put it in, which, by the way, was not very fast, for we were getting a little tired and couldn't help stopping to think occasionally how our friends would laugh at us if it should all rot down. We had urged them in the spring to plant some fodder corn, even if they couldn't build a silo, but most of them thought that they had not room on their farms for the corn, and couldn't afford the silo. Some of them couldn't spend time to go to the institute last year, but took time this year. Most of them had room to sow a little wheat for the chinch bugs, and some of them are well enough off now to buy our marsh hay to feed their stock on while we feed our ensilage.

The Pits Opened.—We covered the silo about October 5th with paper, boards, and about a foot of dry cut corn stalks. The boards, we have since concluded, are a nuisance. About the 28th or 29th of October, when the cows had eaten the last of the green stalks saved out, we opened one pit and found it all that we had hoped. It was not absolutely perfect, for down each corner was a streak, more or less extensive, which was damaged and unfit to feed. We estimated it at about 2 or 3 per cent. of the whole. This has been thrown out in the yard and much of it eaten by the horses, after all, and without any apparent bad results.

Feeding.—From the first of November until about ten days ago, we fed 31 head of cattle, besides giving a little to the horses. At present we are feeding twenty-five, and are enjoying the prospect of having enough left in the spring to feed the cows through a drouth next summer, should one occur.

We have not fed it to the entire exclusion of hay, as some have, because the stock seem to relish a little something dry, even after they have eaten all the ensilage they want. On the whole, we are well satisfied with the results of feeding it. The stock have done better than they ever did when wintered on hay, and, if the use of land on which to raise forage crops is worth anything, they have certainly been wintered much cheaper.

How to Get Land Enough.—While it would seem that the raising of hay at the rate of 1¼ tons per acre, as we are doing in Wisconsin, virtually solves the question of eternal poverty for the farmer, we hope, on the other hand, that the raising of 20 tons of fodder corn per acre, and this preserved in the silo, will yet help us to a solution of the vexed question, how are we boys to get land enough in Wisconsin to make a living from? Certain it is that we shall never be able to buy large farms, and pay for them by working them in the good old way. Our fathers made money once on a time, but we need not expect to do it in the same way now. By a more intensified system of farming, as it is called, we may be able to get a respectable living if we don't own all the land that adjoins us.

Discussion.

MR. MORRISON.—What are you selling the marsh hay at to your neighbors?

MR. VANKIRK.—From $6 to $10 a ton, and that we took in stock because they didn't have money to pay for it, and we put the stock in the barn and fed them on ensilage.

MR. COLE.—There is one defect I have found in silos. They are boarded right up on one side and then turned and boarded on this side, and as soon as pressure comes there will be a large crack, which will let in the air and spoil the ensilage. Now that can be remedied by boarding up four or six feet, and then turning the other way.

MR. BENDER.—I, in building my silo, followed that plan, but with every course of boards, I cut right down into the half of the board, and then in the next course I cut into the opposite half; then, after the silo was boarded up, I took some two by fours, and put on the back side of these boards and spiked them right to that, and fixed the corner every time.

PRES. W. I. CHAMBERLAIN.—I want to say just a word to those why are going to begin the ensilage business. Order your seed corn now. We in Iowa ordered two months before we wanted it, and we didn't get it so as to plant in time. We planted our field corn the 5th and 6th of May, and another field the 11th and 12th of May, and our ensilage corn did not come so we could plant the first till the seventh, and the other until the 13th and 14th of June. Well, it would not mature with us; we had to cut it in August to get it away from the chinch bugs. The ensilage corn grew a crop, and it was the only thing that did. Our meadows did not have a spear of grass on them. If we did run the mowing machine through them, nothing less than a fine toothed comb could find any hay there. Another thing: If you are going to build a silo, see that your machinery is there for six weeks before you begin. We were greatly delayed in that way.

Where we put the ensilage in right green, or wilted a day or two, it was all right, but where we put it in dried four weeks, even though we tried to mix a little green through to start the fermentation, yet it charred, burned so it was not so good. That was the only trouble we had—except that it rained three inches all the time the corn was struggling to grow, and then it rained nine inches and twelve one hundredths while we were struggling to put it into the silo; but in spite of all these difficulties, our thirty acres of corn, half grown, carried a little more than a cow to the acre for one hundred days of the very coldest weather. We fed it to about one hundred cows and we fed it during thirty days, when the thermometer averaged, twenty of those days, nearly fifteen degrees below zero, when, you know, cattle eat a great deal more to keep up the animal circulation.

Now, one or two point briefly: As it was, that thirty acres saved us about $450 worth of hay, as I figured it; that is, half grown as it was, worth $15 an acre to us.

Now, I would not dry the fodder more that one day, or at most two, especially in this catching weather; beyond that, you lose in the cutting, and more too. We found it took three times the power and grinding to cut that dried fodder that had stood out in the rain, with dirt scattered all over the stalks, than when we had drawn it quickly from the field, when it cuts almost like asparagus. Another thing—you want a dry time to put it in. I think if corn is once wet you cannot dry it, anyway.

Now, the question with us in Iowa is, will the silo pay in connection with cheap ten dollar land, that is as fertile as any land that lies outside, that will raise two and three tons of clover and timothy hay, and we had figures at the institutes of men who put up hay for fifty cents a ton. Where you can do that, I doubt whether the silo will pay, but on high-priced land, especially where it is not very fertile, I have not the least doubt that the silo will pay abundantly; but build the silo well, plant early, let the corn cure, and get your machine in time, put it up right and it will be all right. Even under the exceedingly adverse circumstances which we put it up—everything against us—it paid us.

MR. NORTH.—How should the partition be put in?

MR. HIRAM SMITH.—It can be a temporary partition, putting in the planks wherever you want it—putting them into cleats. They are carried up as your silo is being built, one or two planks at a time, and they are taken down as you feed out and piled away for another year.

MR. NORTH.—You don't think it is necessary to double board and put in tarred paper?

MR. SMITH.—No, not necessary at all. Just enough to keep it in position. In fact, the whole business of the silo is just as simply and easily understood as building an ice house. You don't want any drainage; you don't want any grout bottom; you will not have any waste to it, than to a body of ice. You want a foundation to set your frame on; throw up the earth inside the walls, set your studding, and you have all the drainage you want. If the silo bottom is one foot above the surface outside, there is no water goes up hill, and that's all the drainage you need. Just put something in the bottom, so the feed will not be dirty. You want to get heat into it and you want succulent feed. Heat is the fundamental principle of the whole thing. You will heat it up before it is scattered into the corners and trampled down; that will prevent any trouble in the corners.

MR. NORTH.—In feeding off, do you feed out of one side?

MR. SMITH.—Yes. There is a good deal of lateral pressure while it is simply green. If you carry it sixteen feet high, you want at least a two by ten every fifteen inches; if you carry it eighteen feet high, you want a two by twelve, in order to carry the excess of lateral pressure, but after three weeks, the lateral pressure ceases entirely, and there is no danger about your partition. Of course, if you open both pits at once, it is the same as not dividing it at all, and I have my doubts whether it is necessary to divide it at all.

MR. J. A. SMITH.—I think the superintendent will bear witness that probably I have heard more silo talk than any other one man in the State of Wisconsin, for I have attended all the institutes since they have been begun, but last Friday I heard something new. The question of the division in the silo has come up several times, and from the testimony of gentlemen who have talked about it, I have come to the conclusion that the partition in the silo is all a humbug, that you don't want any at all. We had with us at Hartford at the institute, last Friday, a gentleman who has had considerable experience in silos. He has built a silo one hundred feet long and sixteen feet wide; he has a door in the end, and has a long carrier by which he distributes the feed for the whole length of the silo. He begins filling one day in one end, and so on until he gets clear to the other end, and then he goes back again over the same ground, so that his feed is all in one compartment. By figuring, you will see that that sized silo will hold over six hundred tons, which he uses for the purpose of making beef. When he begins to feed from the silo, he begins at the door end, and cuts down a slice four feet wide, covering just so much as he cuts off, and the air striking the fresh cut place, does no damage before he wants another slice, and after he has cut one or two more slices in that way, he has room enough to operate from, and he then pulls down the raw edge, as you might call it, so that he has an inclined plane to draw from, making it easier and faster work. I believe that the day has come when we don't want any partition at all in the silo.

MR. URQUHART. — I filled one last year without a partition at all, filling one end of the silo one day, and the other end the next, and I found it came out almost as well as where I had it in two compartments. In feeding out, we were told that we would have to take off and feed it from the top. I took off and began feeding from the end. The end was against my barn, and I took off that end and kept it at an inclined plane of about forty-five degrees, and we would just rake it down, and it worked well.

MR. HOXIE.—I am glad to hear this testimony come out, for at a convention at Mazomanie, I made the statement that it was not necessary to have this partition except for temporary purposes, and the whole convention came down upon me.

DOES THE SILO AND ENSILAGE PAY?

By J. H. FOSTER, Winnebago County, Wis.

Twelfth Paper.

The Months for Butter.—In former times the months of June and October have been the months for the production of the best and sweetest butter. This is because the grasses at these times are filled with the choicest and best of the juices and aromas, which are treasured up and given out through the medium of earth, atmosphere and sunlight. In these months the grasses attain their highest perfection in storing up the essential sweets which are so recognizable in butter.

A Food Found for Cows.— From this fact it has long been the desire of the butter-maker to find a food for his cows that posesses the qualities of juices and sweets that are contained in the June and October pasturage. If, he has said, during all these years, I could only find a permanent food ration for my cows that would enable me, at all seasons of the year, to produce butter having the quality of the butter made in those months, and that would keep up the flow of milk of those months, it would pay to keep cows for dairy purposes, and would give a satisfaction to the work as well as being remunerative. Many substitutes have been formulated and tried, but always with inconsiderable success. It was therefore with great joy that the dairyman and the farmer hailed the light of promise that came in the announcement that a receptacle could be made for green forage plants and grasses that would perfectly preserve them for months, and even years, and in such a form as to retain the juices and sweets (during all this time) unimpaired, and that cows fed upon this food would give milk that would produce results as good as when they cropped for themselves the pasturage grasses of June or October; and further, that quantity as well as quality, would be maintained. While this, as I have said, was a welcome announcement, it was received with a great many grains of allowance, and was believed with a great many grave and serious doubts. It seemed to be too good to be true. As the years went by, the evidences of the truth of the assertion continued to accumulate, and there were persons in our own state who had the courage of their belief and convictions. They gave the matter a trial. Wherever there was a trial made, and made as it ought to be made, it was a success, and like a falling body, the idea gained force by its own momentum.

Change in Farming Methods.—As one engaged in farming in a small way, I had long been convinced that unless we could find some way to change our methods of farming, some way to increase production, and that, too, in a way that would cheapen as well as increase it, farming in Wisconsin, with from six to seven months of feeding time, and in competition with the milder climate, and the cheaper lands of the Southern and Western plains, would become unprofitable and ruinous. In this condition of things it was with eagerness and intense interest that I listened to what would, to a novice, seem to be a fabulous statement of Superintendent Morrison's workers, of the value of the silo in preserving, in the ensilage form, our forage crops, and of the wonderful feeding value of ensilage to all kinds of stock, especially to milch cows.

Building a Silo.—Becoming acquainted with John Gould, the ensilage enthusiast of Ohio, I listened to his talks on ensilage, both in public and private, until his extreme idea seemed to be true. Convinced that something must be done, and saying to myself, "I do believe," with quite a little of the "Help Thou mine unbelief," I went to work last summer and built me a silo. The silo was built inside of the barn; was one of the bays of the barn, the barn being 32 feet in width. The bay was naturally fourteen feet wide, with a basement eight feet below the floor. The entire depth of the silo when finished was twenty feet, making it inside about twelve feet, four inches by twenty-eight feet, four inches, and twenty feet in depth.

Corn—Drouth—Feeding—I had, in preparation for it, planted eight acres of ensilage corn. Despite the most terrible drouth ever known in our section of the state, this corn grew, to a fair maturity, a green crop of fifteen tons to the acre. From this crop I fed my cows and work horses until the time for filling the silo. What was left, (about 100 tons), I cut into my silo. I have been feeding from this during the winter, and am now prepared to give my testimony as to its value as a food for stock, and to its preservation in a green, sweet condition in the silo. There was but little loss from mold or decay. The most of it came out bright and good, and nice, palatable and nutritious food. To me it is a demonstrated fact that the ensilage fodder is the stock fodder of the coming years, and the silo is the place in which it will be stored and preserved. That it is the most economical food that we as farmers can use, is demonstrated by the most simple calculation.

Yield of Ensilage Corn.—A fair average yield of ensilage corn would be, at the least estimate, 15 tons, or 30,000 lbs. per acre. Fifty pounds per day for a season of 200 days would be 10,000 lbs. or five tons. At this rate one acre would produce enough to feed three cows the entire season of 200 days. Or, if you could get your cow to eat 60 lbs. per day she would consume 12,000 lbs., or six tons in the 200 days, or at the rate of two and one-half cows for the 200 days upon the product of one acre. The same cow, if fed upon well-cured, good hay, would consume at the least calculation two and one-half tons, being twenty-five pounds per day. To keep one cow on hay would require the product of one and one-fourth acres; or stated in another form, it would require the product of one acre to keep four-fifths of one cow for the season of 200 days. This estimate is based upon the product of two tons of well cured hay per acre. So you see that an acre of fodder corn of fifteen tons, green weight, would, if well preserved in the silo, keep one cow 600 days, giving her 50 pounds a day, and that one acre of hay that would produce two tons of well cured hay would feed one cow 160 days, the feeding value being three and three-fourths times greater in the acre of ensilage than in the acre of hay. If the ensilage were fed at the rate of 60 lbs. per day, the 15 tons would feed one cow 500 days, giving the feeding value of the acre of ensilage three and one-eighth times greater than the acre of hay. These estimates are not strained or extravagant in the least degree, but are fair—fairer indeed to the acre of hay than to the acre of corn, for the acre of ensilage corn oftener weighs 15 tons than the acre of hay does two tons.

Does the Silo and Ensilage Pay?—These being the facts, it would seem unnecessary to ask: Does the silo and ensilage corn pay? Of course there is a greater amount of labor required to produce and preserve the acre of ensilage corn, but the extra expense is in no way comparable with the extra production. Had I the time, it would be both interesting and profitable, to pursue the comparative estimate in the direction mentioned; but enough is known to clearly assert that, comparatively speaking, the increased production is *large*, while the increased cost is *small*. The silo has come to stay, and the staying and successful farmer will avail himself of this valuable adjunct to his farm properties, just as fast as his means will permit.

Building and Filling.—Of the building and the filling of the silo, I will not stop to speak, as that has been so ably and so fully done by others who have spoken on the subject. But I will say this—in building a silo, build it well. Lumber and tarred paper properly used, and used wherever needed, will make an air-tight silo, and this is the one thing of prime importance. It is the great prerequisite in the preservation of the ensilage. I built mine well, sparing neither time nor expense, in all that pertains to making it air-tight and strong. The result has proved the wisdom of this course, in the successful preservation of a juicy, nutritious and palatable feed. In filling do it with judgment and care. Don't cut any wet or moldy corn into your silo, and then expect it to come out bright and sweet. If you do, you will find, when you come to take it out, that your sin, or carelessness, has found you out. You can't expect any more to "gather grapes from thorns, or figs from thistles," from the preserved fruits of the silo, than could the people of ancient time from the plains of Galilee, or the hillsides around Jerusalem.

The Silo and Ensilage Pays.—Yes, the silo and ensilaged feed, does pay. It pays in many ways. In the furnishing a food for the cow that is largely similar to the pasturage grasses of June and October—one that will give almost or quite as good results in the milk and butter product as they. It prepares the farmer to laugh at the drouth, and to feed his cows as well when the pastures are all dried up, as when they are at full production, and keep the flow of milk at its full. It enables him to make a uniform quality of butter the year round, giving a constant summer in the dairy from the year's beginning, to its end. It enables him to keep twice or three times the amount of stock that he formerly could, and he can keep his steers growing almost or quite as fast during the winter months as in the summer, the better preparing him to compete with the ranchman of the Western plains. Yes, Mr. Chairman, as the question now stands, "Does it pay to build the silo and feed ensilage?"—I answer aye.

TELLING FACTS IN FAVOR OF ENSILAGE.

Claims of Ensilage.—Recently the Kansas Board of Agriculture appointed a committee to investigate the claims of ensilage. The committee was made up of men well known throughout the world of agricultural progress—Prof. Shelton, A. C. Pierce, Wm. Simms, Thos. W. Potter and O. E. Morse. Their report concludes as follows (SUPT. MORRISON):

1. That the time has arrived when the more progressive and economic methods of conducting the dairy and beef producing interests should command the thoughtful consideration of Western farmers. 2. That the method of preserving green crops by means of silos, now common in the older states, is generally commended as *practical* and *profitable* by those having the largest experience in the business. 3. That ensilage, if intelligently prepared, is a good, wholesome article of food for cattle, and when fed as it should be, in connection with dry feed, will materially increase the product and profit of the dairy; make the production of beef more remunerative; improve the condition of hogs, and enable the farmer and stock-grower to realize profits not promised by the methods now common in the West.

4. That corn is the most profitable crop for ensilage, and for this purpose, the seed should be drilled at from eight to ten inches, in rows three and one-half feet apart. Good cultivation is required, and the crop should be cut just before or about the time the ears *begin* to glaze. 5. That corn planted, cultivated, and cut as above indicated, will average not less than twenty tons of ensilage per acre; that in feeding value, three tons of corn ensilage will equal one ton of tame hay, or that one acre of corn, when made into ensilage, will equal about seven tons of hay; that the feeding capacity of a given amount of land can be at least doubled by the method proposed, and without adding materially, if at all, to the cost per head of animals fed.

Feeding Cattle on Ensilage.—The following account of an experiment with ensilage is taken from an English Journal (HON. C. V. GUY):

"At Leicester the other day, a company of agriculturists partook of luncheon from beef of a twenty-two-months'-old-steer which from birth had been fed on nothing besides milk, ensilage and linseed cake, and whose carcass weight when slaughtered was 660 lbs., which at 14 cents per lb. would give a value of $95.78. The quantity of ensilage consumed was 28 lbs. per day from the age of three to six months; 35 lbs. per day from six to eight months; 45 lbs. per day from eight to ten months; 50 lbs. per day from ten to twelve months; and 55 lbs. per day from twelve to twenty-twonths—making 27,196 lbs. altogether, which was the produce of 1½ acre of clover, mown twice. In addition to this, the animal consumed 939 lbs. of linseed cake, 45 gallons of new milk consumed in the first month, and 124 gallons of skim milk in the second month. This was valued at $9.22, the ensilage at $14.43; linseed cake, after deducting one-fourth for manurial value, at $12.20, and after adding $23.50 for labor and attendance, cost of litter and cost of calf when experiment commenced, there was still a balance of nearly $37 in the animal's favor. The beast did well on the ensilage, and was thoroughly healthy throughout, and the beef was considered to be of excellent quality, so that the experiment, which was conducted by the Ensilage Press Company, may be considered as having established two very important conclusions—first, that cattle may be fattened entirely on ensilage and linseed cake, no addition of hay or dry fodder being requisite; and, secondly, that when fattened, a very satisfactory return may be realized, quite equal to that usually derived in feeding on roots and hay."

Ensilage Butter.—Some believe that the milk from cows fed on ensilage will not make fine butter. In answer, I append the following correspondence (SUPT. MORRISON):

Wm. E Clough, Chicago. Dear Sir—I send you to-day by express three tubs of butter. Perhaps you are not aware that the butter I had sent you since the middle of last November (4,000 pounds) was made from the milk of cows that were fed daily from 45 to 50 pounds of corn ensilage, with wheat bran and hay.

As the ensilage is now all fed out, I write to ask how this butter will compare in quality with that I have sent previous winters.

I wish you to give your opinion frankly, so that I may determine whether I had better fill my silo again or not.

Whitewater, Wis., May 1. C. R. BEACH.

C. R. Beach. Dear Sir—Answering yours of May 1st, I would say that your butter during the past winter has given eminent satisfaction to our best trade. It has sold promptly, and been inquired for often by parties desiring fine butter, who often wait from day to day to get the goods rather than take any other. The desire to obtain it has been more marked this winter than ever before. We hand you herewith returns, shipments received to-day. Buyers were waiting for the goods when they arrived. Thanking you for continued favors,

Chicago, May 2. WM. CLOUGH.

I shall plan to fill my silo again.

CHAS. R. BEACH.

THE BUILDING OF SILOS.

By JOHN GOULD, Western Reserve, Ohio.

Disadvantages of Stone.—The apparent abandonment of stone, or concrete, for the building of silos, and the almost universal adoption of wood in its place, has brought out a considerable inventive skill on the part of the builders. The reasons for discarding stone arise from two principal causes. Stone is not always abundant when needed, and the attending cost is often more than the farmer cares to assume. Stone, too, is a poor material with which to build to secure the now desirable *ripened* or sweet ensilage. Being a remarkable conductor of both heat and cold, it first absorbs the developing heat of the ensilage, and prevents the material along the walls from approaching 125°, now demanded. In cold weather, the reverse becomes true, and the warm ensilage on the one side of the wall condenses the entering frost on the inner surface, and there is a loss of more or less ensilage by mold, decay and kindred wastes. This is not so pronounced with the silo built of lumber, boards and paper. The wood being a good non-conductor of heat and cold, these influences play an unimportant part. The ensilage heats up readily against the walls. The frost has but little influence, and the waste is trivial, the greater part being in the corners, a matter which can be remedied by filling in the angles each day with hot ensilage from the center of the pits.

The Wooden Silo.—How shall the wooden silo be built? There are several variations of the same plan, for the silo must be a box of varying dimensions, usually twice as long as wide, and as deep as wide, though now the silo is often found twenty-five feet in depth, and with apparently corresponding good results, as the deeper it is, the greater its own settling weight. The silo in the barn, and the one built as an addition or annex to the barn, differ only in this: The latter must be provided with a roof, and, for appearance sake, should have a siding of some description. The silo inside the barn wants neither, as the sides of the barn make its outer cover, and the one roof covers silo and barn alike.

JOHN GOULD.*

A Strong Building Needed.—The wooden silo needs to be a strong building, and well secured at the sills, to prevent spreading, and at the top to guard against springing out of the building. This is not so much to be guarded against in the barn-silo, as the frame of the building increases the strength of the silo walls.

Building in the Barn.—In building a silo in the barn, it is not economy to try to make the barn answer in part for the other. The silo should be built independent of the barn, i. e., it should have its own frame work, although the studding can be much lighter than the out-door silo. Nor should any attempt be made to join wood and stone in silo building. If there is a stone wall under the barn, let the scantling for the silo go down *inside it to the ground*, and so leave an air space between the stone wall and the silo lining. The same objections are met with in this case as in the stone silo, and it is hard to join wood and stone so there will be no giving way of the joint, and air will enter. The whole secret of silo building is to make air-tight walls. The floor or cover are not nearly as essential to the securing of No. 1 ensilage.

Plans and Diagrams.—As it is very difficult to give any plans to guide one in building silos inside of barns, the accompanying diagrams are for silo annexes to barns; but this much is common to all: The inside lining and fixtures of one are just as applicable to the other. It is proper to say that the illustrations accompanying this text, were drawn by Mr. A. P. Gould, of Canton, Ohio, expressly for this article.

Fig. I, p. 82.—Shows a good way to make a secure foundation. The soil is all excavated from the floor to the depth of about one foot over an area covering the outside measurement of the walls. A trench is then sunk, just inside this excavation, and built up a little above the outside surface of the soil, as seen at A. A sill, 8x8, is bedded into the inside foot of the wall at B. The studding C, for the frames, is cut with a shoulder,

---

*John Gould is a native of the "Western Reserve" of Ohio, born of poor parents, and about 44 years of age. Always living on a farm and getting his education at the country district school, Mr. Gould has picked up quite a stock of general information, and has had, besides, the experience of twice going in debt for a farm, and paying the whole amount from its earned proceeds, which is his practical experience of farming. While never losing his grip on the farm, Mr. Gould has had considerable journalistic experience, having been, at one time, a staff writer of the Cleveland, O., *Herald*, and later on, for years, its agricultural Editor. Since 1879, Mr. Gould has been a regular on the *Ohio Farmer* force, and for the past four years has furnished considerable "requested" matter for the leading agricultural papers, East and West. In 1883, when the Farmers' Institute course was adopted in Ohio, Mr. Gould became one of the corps of assistants, and since then, the larger part of his time in the winter has been devoted to institute work. In 1886 he was selected as a corps writer for the entire winter list of institutes in Wisconsin, and the following winter was elected to the position of Assistant Superintendent of Institutes.

and set on the sill, the spur going down inside to the earth floor, D. The studding for the building should be 2x10 inches, and set 16 or 18 inches apart on the sill. The inside lining of the silo comes down close to the natural soil of the floor, F. By this plan, the trench affords needed drainage, and the slight excavation gives the wall the *back support* of the natural earth, G., and is not only thus made secure, but gives "dry footing" to a building that of necessity must be built with sills close to the ground.

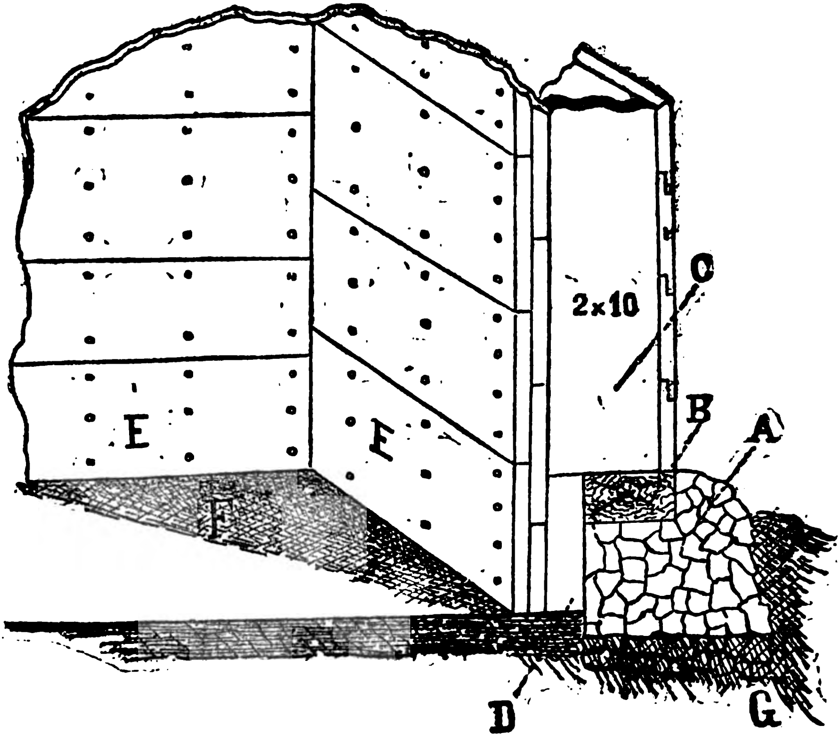


FIG 1. FOUNDATION OF SILO (*For Description See Page* 81).

Fig. 2, p. 83.—Shows the same general outline, except that the stone work is dispensed with, the sill P being bedded in the mass of cement depicted. To prevent the building from spreading, cross sills, N, 2x8 inches, are framed into the sill, P, at the lower side, crossing to the opposite sill. The studding, B, is mortised into the sill, and the silo is lined up inside with two thicknesses of inch boards, 8 or 12 inches in width, as shown, breaking joints with a half lap, the tarred paper, S, being between them, the three strongly nailed to the studding, B.

Fig. 3, p. 84.—Gives the general form of construction of the silo, with the corner "cut away" so as to show the framing. P is the sill; B B B the studding; A the corner post, showing the crossed corner; T the door; E E the inside lining, the same as Fig. 1; H is the siding lumber of any sort; R is the inside plank partition, fitting into the grooves, S S S. This partition is made of two-inch plank with jointed edges, not matched. As the filling of the silo progresses, the planks are added as required, until the top is reached. When feeding out the ensilage, the pit is better than jointed plank. To prevent the planks from springing by each other, two or three pins can be put in each one, fitting into corresponding holes in the plank above. The rest of the cut is self-explanatory, and aside from the siding wall, represents a silo in a barn interior.

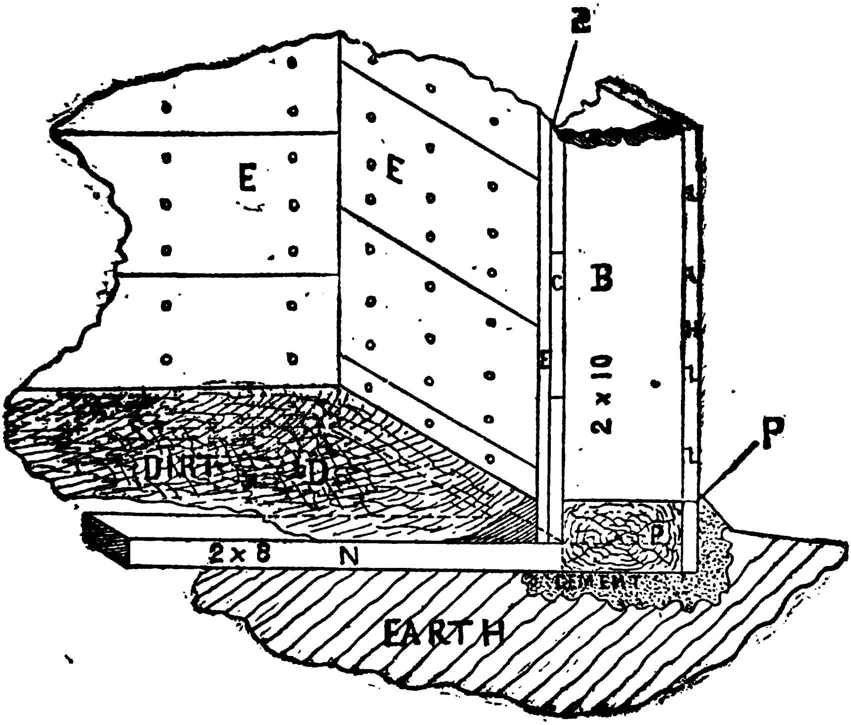


FIG 2. FOUNDATION SHOWING SILLS BEDDED IN CEMENT (*See Page* 82).

K is first fed. Then the cover is removed from the next pit, and as the feeding progresses, the planks are removed one by one. They should be numbered so as to be replaced in order when refilling the silo. If a solid partition is thought best, 2x4 scantling will be set up across the silo in placing the planks, and ceiled up, both shown in Fig. 7, but it does not appear wherein it

Fig. 4, p. 85.—Shows an enlarged view of the corner in fig. 3, and will be readily comprehended by any carpenter. The inside lining boards, D C, are cut in at the ends, and crossed; the 4x4 scantling, A, being set in the angle. The studs, B B, are set in the two outer angles. The boards are first nailed to A. When the first lining boards, J J, are all in place, the studs, B B, are put up, and nailed to *from the inside.* The second lining boards, E E, are simply cut with a square end, and nailed tight to B B. This gives a corner of great strength, that it is impossible to pull apart or burst through. F G are false studding to build out the corner to nail H H to, so as to give the corners a finished appearance.

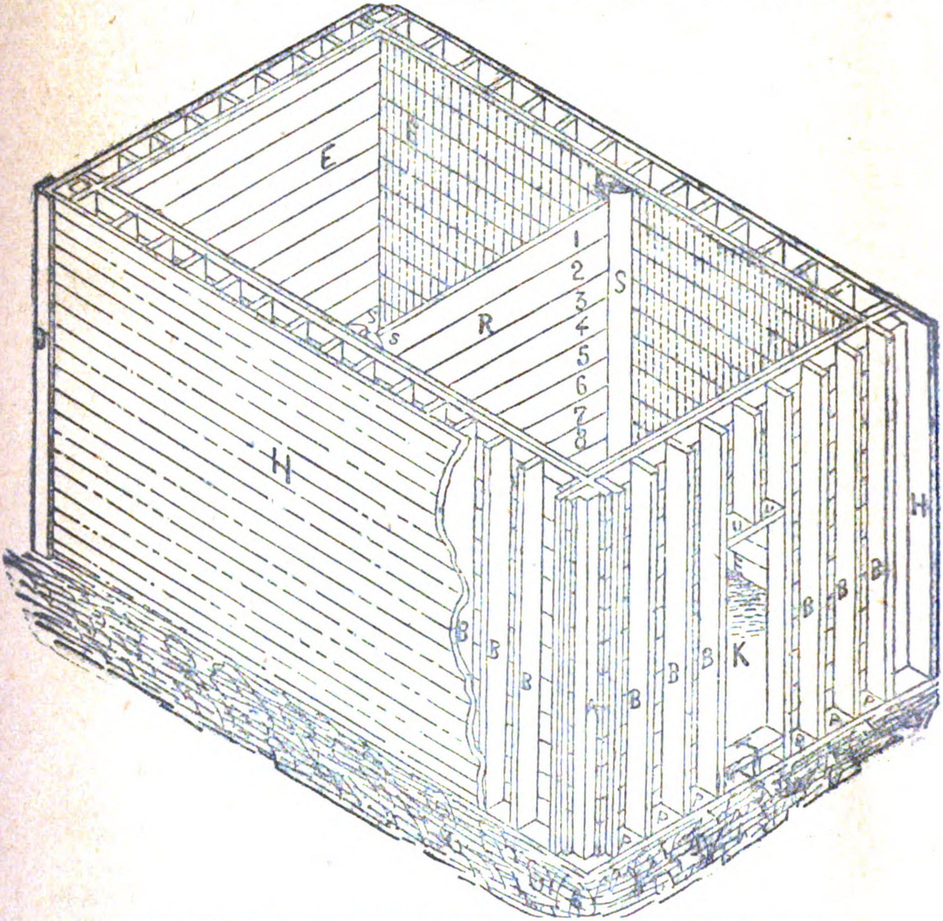


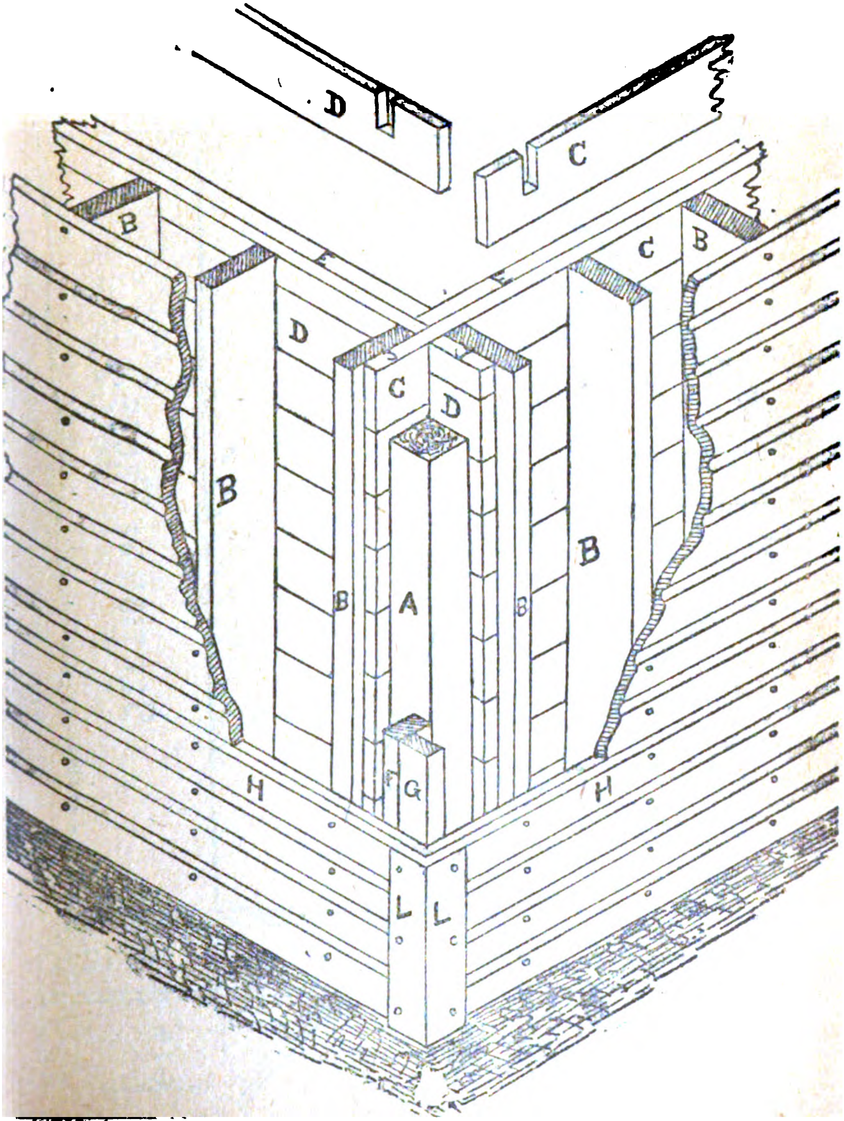
FIG. 3. GENERAL FORM OF CONSTRUCTION OF SILO. (*See Page* 82.)

Fig. 5, p. 86.—Shows the plan of truss roof, to not only strengthen the building, but also keep the walls from springing out at the top. By the plan it is seen that no plate is used, and the rafters, K K, 2x8 inch, are spiked to the top of the studding, B. The under cross ties, L L, are 1x8, and at the heel, are nailed strongly to the opposite side of the stud from K. The three can then be clinched by using wire 20d. nails

Fig. 6, p. 87.—Is an enlarged plan of fig. 5 at K, and is, with fig. 5½, p. 87. clearly depicted.

Fig. 7, p. 88.—Shows the two forms of partitions, plank, double, B, and ceiled on scantling A. The planks are held in place by cleats fastened to the walls, and the other partition is tied into the walls at A, and secured by the scantling C.

Fig. 8, p. 89.—Shows the silo complete. The Dormer window is placed over the center of the partition, so that when



IG. 4. ENLARGED VIEW OF CORNER (*See Fig. 3*).

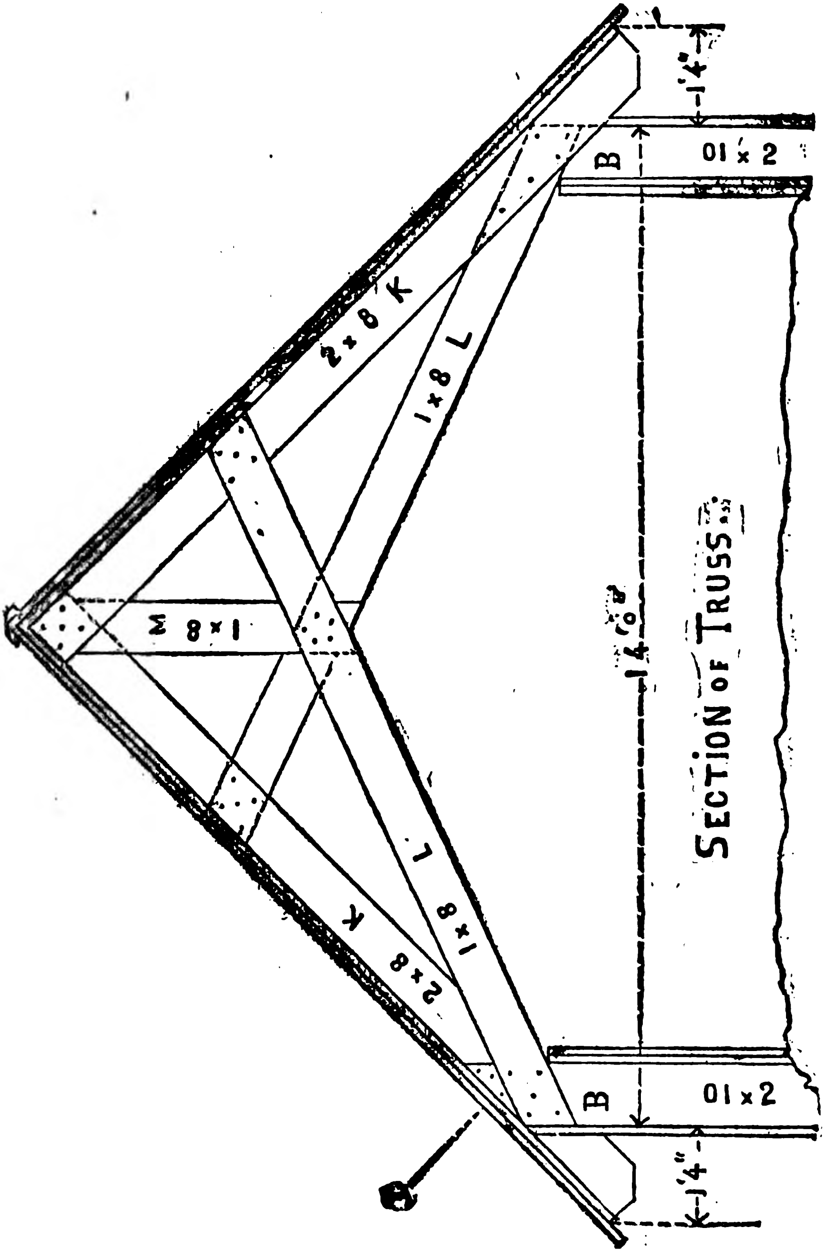


FIG. 5. PLAN OF TRUSS ROOF (*For Description See Page 84*).

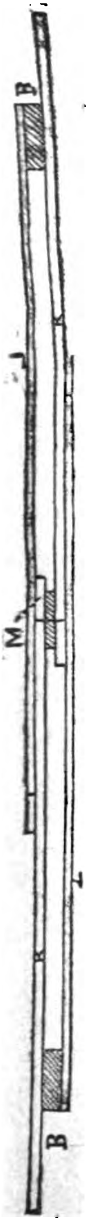


Fig. 5½. PLAN OF TRUSS. (*See Page* 84.)

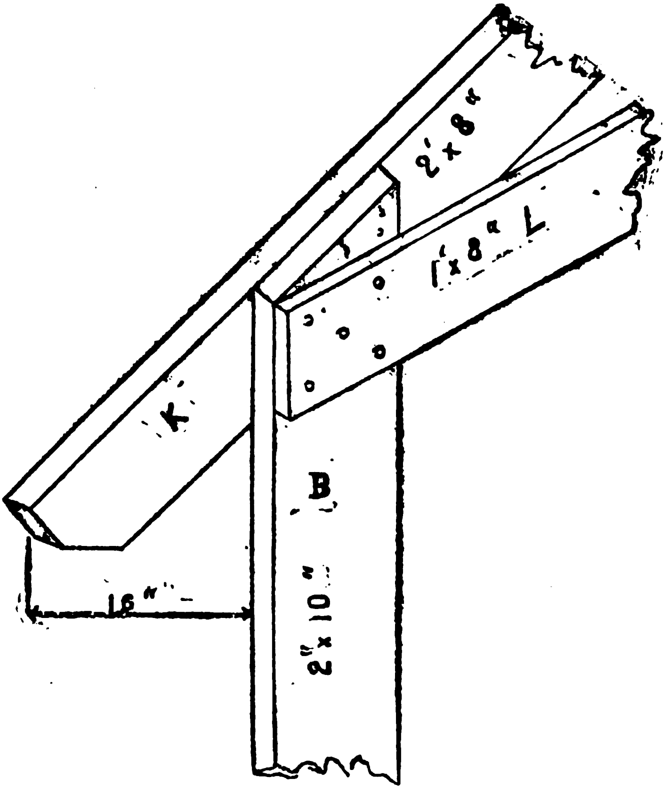


FIG. 6. SHOWING HOW RAFTERS ARE SPIKED (*See Page* 84).

the carrier of the cutter is run in through this window, the ensilage can be distributed at will in either pit. If preferred an aperature can be cut in under the eaves, and one need not be at the expense of the roof window.

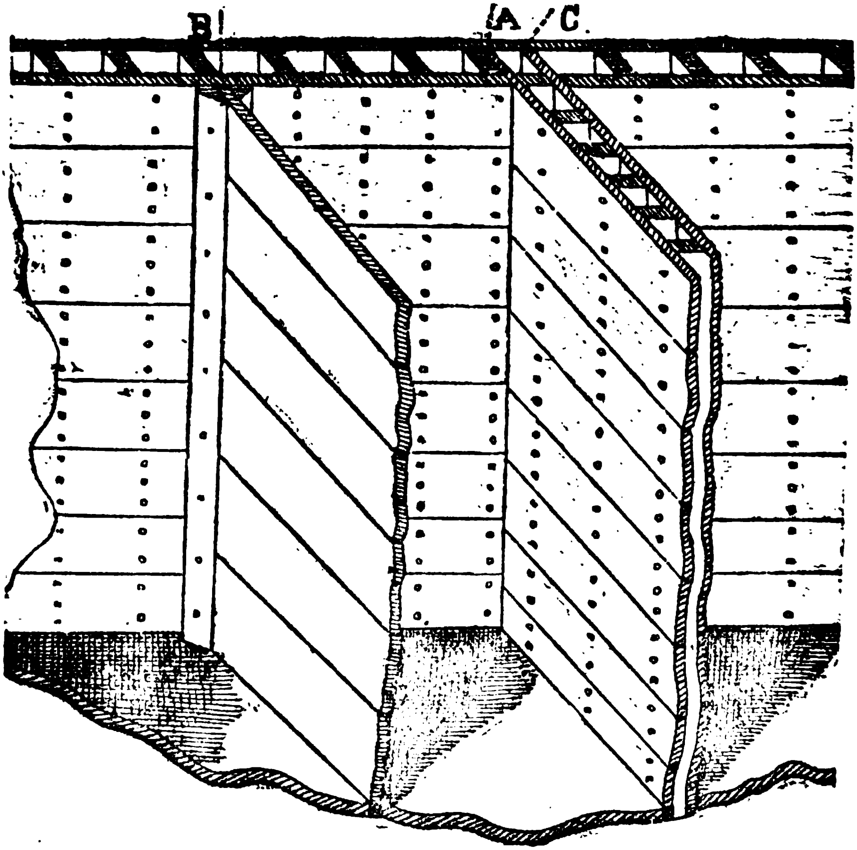


FIG. 7. PARTITIONS OF SILO (*For Description see Page* 85).

Inside Facing.—A few words about the inside facing of the silo. While there is no absolute rule about silo building, the air-tight wall cannot be lost sight of, and some contend that, for the inside face, paper first put upon the studding, and then covered with one thickness of matched flooring, is all that is required. If only one thickness of lumber is used the paper will add no value, as it will spring away from the boards between the studding and allow the free admission of air between paper and board. Taking cost of No. 1 flooring, and two thicknesses of common inch boards, the difference is but little, and then if the paper is put between the two, a solid air-proof wall is secured. Matched lumber is liable to have the grooving broken by swelling, and a defect is at once made in the walls, which cannot happen with the other method, as shown in Figs. 1 and 2. The last, a finishing lining, E, in Fig. 2, had best be surfaced on one side to prevent, as much as possible, dragging in the settling ensilage.

Painting—Floor.—The wooden silo needs a cheap, water-proof paint to secure it from decay. So far, coal tar, made and applied boiling hot, and reinforced with some rosin, to give solidity to the tar after application, is probably as cheap and durable as any substance, although pitch, and other roofing paints that harden well, are each and all good. The floor may be thinly covered with

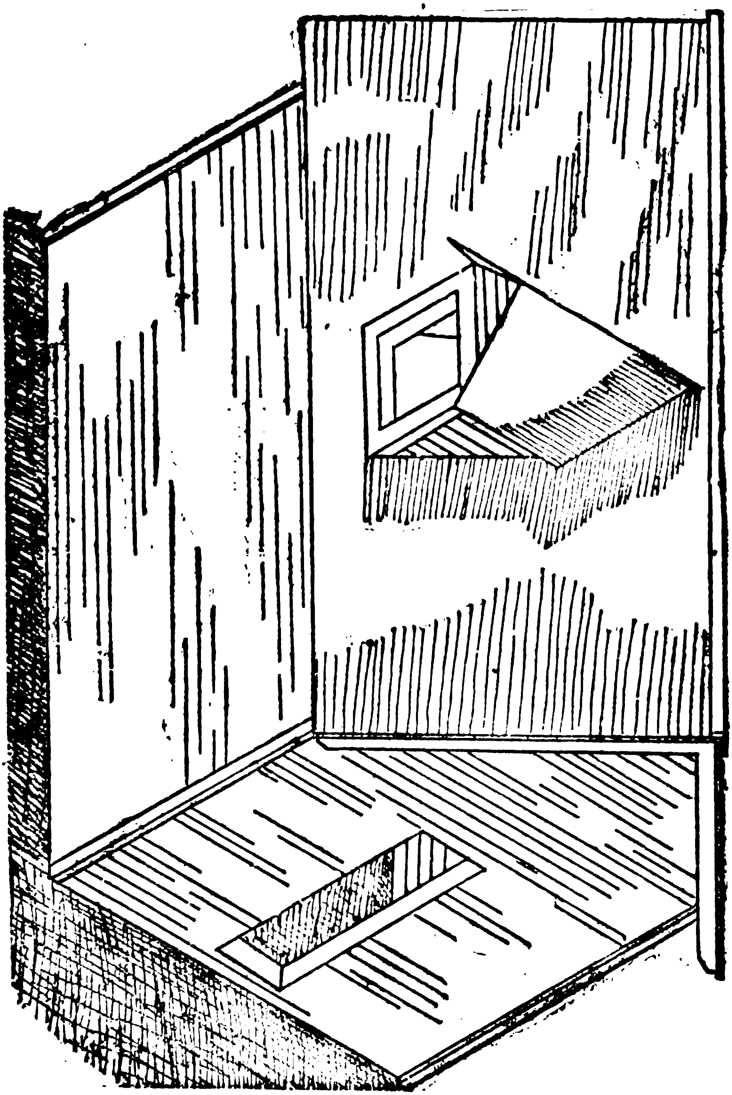


FIG 3. WOODEN SILO COMPLETE (*For Description See Page 85.*)

cement plaster, but it has very little superiority over clay well pounded down, and allowed to come up a few inches on the inside of the silo walls, as seen at D in Fig 1.

Cost.—The cost of a silo is impossible to tell without all the incidentals and conditions of building, but it may be safely said that it varies from about 50 cents per ton for the cheapest, to $1.50 for the most expensive. Its cheapness, however, is apparent for the outlay for storage for 2½ tons of ensilage is reckoned as against the storage for hay. The former occupies less than 125 cubic feet, and the ton of hay over 500. So silos cost far less than hay barns. What silo building may develop into in the future no one can tell, but it would appear that the changes in the future will be far less than in the past, and silo building has now reached somewhere near definite rules.

CATTLE SESSION—MARCH 29.

THE CATTLE INDUSTRY.

By J. McLAIN SMITH, Dayton, Ohio.

First Paper.

W. D. HOARD in the Chair.

Fertility.—In these days of low prices and sharp competition it is only the large crop that pays. But in order to grow big crops, and at the same time preserve or increase the fertility of our lands, we must have an abundant supply of manure. No farmer, it seems to me, should be satisfied with his life, and no farmer can be considered successful in the highest sense, unless he leaves his land in better condition, and more productive than he found it. This can only be done by the direct application of fertilizers. There is no recuperative capacity in the soil itself, except its gradual disintegration, and the slight annual addition of nitrogen—not half enough to balance the annual removal in the crop, and the plowing under of clover and other green crops, while it improves the texture, and renders the plant food more available, does not add to the stock. It helps the pump but not the supply of water. No plant *creates* fertility. It only concentrates it, and renders it available. If we would make our farming successful in the highest sense, we *must* restore directly to the soil a considerable portion of the nitrogen, phosphoric acid, and potash removed in the crop.

Keep Some Neat Stock.—Except in the case of gardeners, whose large returns justify liberal expenditures for fertilizers, this absolutely requires, in my judgment, for all this region, a considerable number of neat stock, at least one cow or steer to every five acres of land under cultivation. I say it necessitates *neat* stock, because nothing else will supply their place in the hands of the general farmer. Hogs do not consume the rough feed on a farm; and brood mares cannot, generally, be kept at a profit in sufficient numbers. Except in the case of gardeners, therefore, I think I am justified in saying that no man can be permanently successful in farming who does not keep at least one head of neat stock to every five acres of land under cultivation. In many cases, doubtless, it would be profitable to keep two or three times this number. But one to five acres, I believe, is essential to make grain growing permanently successful. In this state you have, in round numbers, a million and a half of neat stock to eight million acres of improved land—or very nearly the proportion I have given. But a large part of these are concentrated on farms specially devoted to stock growing or dairy husbandry. The ordinary grain farm does not carry, I apprehend, on an average, half this proportion, and it is to the ordinary grain farmer, or the farmer engaged in mixed husbandry, that I wish to address myself.

Plant Growing.—Plant growing, including grain and textile material, must ever be the principal business of agriculture. The world must be fed and clothed, and the feeding and clothing will ever be largely of vegetable products. These products, in this country at least, can be and should be grown on half the present area. But in order to do this and make the industry in the highest degree successful, grain growing and stock growing should go hand-in-hand, *and on the same farm.* Manure is too bulky to transport to any great distance. The stock should be kept, as a rule, *where the manure is wanted.* What we need, I think, is fewer great cattle ranches and a larger stock of cows distributed over our grain farms. The most successful farming of the future will be, I think, in this line—grain growing and stock growing combined; and the cattle industry will be, and should be, as widely distributed as agriculture itself.

What Breed of Cows—Will be employed, will depend on circumstances—soil, climate and special local and individual adaptation. In the vicinity of large cities milk, perhaps, will be the profitable product. In others, specially adapted to the purpose, butter and cheese. In others, beef. If milk is to be the leading purpose, a breed should be selected that will give the largest return of milk in proportion to food consumed. If butter and cheese is our principal resource, then select a butter and cheese breed. If grain growing is our object, and the cow is kept as an incident or auxiliary to this, or if the production of beef is to be the main thing, then select a breed that will make beef of high quality and at the least cost. But this, I think, is certain—that in all the region east of the Mississippi a cow must do something more than raise a calf. Mr. Dunham or Mr. Ellwood cannot breed a colt, in their establishments, as cheaply as you or I can breed it, from a mare that pays for her keep in honest work. At present, and perhaps at all times, they can get enough more for their colts to cover the difference in cost. But beef cattle do not sell on the reputation of their breeder; and a cow cannot be kept profitably on lands worth forty to sixty dollars an acre, merely to raise a calf. Just as good a calf can be grown, with additional work, from a cow that will pay for her keep, and all the additional labor, in dairy produce. The great stock farms, in all the region where grain growing is possible, are destined to break up. They must give way to a more progressive, and a more scientific agriculture. They cannot compete with the general farmer, where the milk and the manure of his cows pay all his expenses. These great stock farms, where all the land is used to grow cow feed, and the cow is kept a year to grow a calf, worth, at weaning, perhaps fifteen or twenty dollars, *must go*; the sooner they go the better; and the cows that cannot produce more than milk enough to raise a calf may as well go along with them. Beef growing cannot be very profitable in this State with such cattle.

A Good Beef Animal.—Just as good a calf can be grown on skim milk, with some addition to replace the cream; and just as good beef can be made from a breed of cows that will raise a calf and pay for their keep beside. The idea that a good beef animal is, of necessity, a poor milker, is an absurdity. You might as well contend that a sheep cannot grow both wool and mutton. There is nothing more inconsistent in one set of attributes than in the other. The fact that our best beef breeds are generally poor milkers proves nothing. Any breed would be poor milkers, handled as they have been. The large and continuous milking of a good dairy cow is an artificial, and in one sense an unnatural condition. They require constant care and selection to keep the breed to the highest notch. Neglect them for a few generations, and they revert to what may be called their natural state—simply giving milk enough to support their offspring. Our beef breeds generally are poor milkers, because heretofore the breeders of beef cattle have not desired good milkers, and have made no effort to secure them. On the great ranges *now* such an animal is decidedly preferable, and a good milker is a nuisance.

Milking Qualities.—That good milking qualities are not inconsistent with the capacity to lay on flesh, is abundently shown in the history of the Shorthorn. When first introduced into this country, the cows of that breed were generally good milkers, many of them having records of twelve to fifteen pounds of butter a week, and some reported as high as twenty pounds, on grass alone, and they were in no wise inferior as beef cattle. In England, to-day, where milk is of more consequence than it has been thought in many parts of this country, the Shorthorn is the leading dairy breed. Many of the strains are not eligible to record, and possibly not strictly pure, but certainly Shorthorns in blood and in appearance, are as fine dairy stock as the world contains. A Shorthorn, three times at least, and I believe four times, in the last five years, has carried off the prize as the best milker at the great London Dairy Show—a prize which is awarded from actual test on the ground, and where all the great dairy breeds are competitors. It is not likely that one of these cows would be successful at the same time in a fat stock show. But there is no reason in the world why her steer calf should not be.

Public Tests.—We have had too few public tests as yet in this country to make any just comparison between the breeds. In England, however, they adopted that system of awarding prizes much sooner, and the results are significant. Taking an average of all the animals tested at the British Dairy Farmers' Association meetings, during the last eight years, we find that 73 Shorthorns gave an average of 42.80 lbs. of milk in twenty-four hours, which contained 12.80 per cent. of solids, and 3.69 per cent. of fat. Fifty-six Jerseys tested gave an average of 28.11 lbs. of milk, which contained 13.87 per cent. of solids and 4.31 per cent. of fat. In other words, taking no account of feed, the Shorthorns are decidedly the better dairy cows, whether for milk or for butter. The Jerseys gave the richer milk, containing 1.06 per cent. more solids and .62 per cent. more fat; but they gave on an average, 14.69 lbs. *less* of milk per day, or just about *two-thirds* as much as the Shorthorns.

Private Tests.—These yields are all small as compared with the private tests we see quite frequently published in the agricultural papers. But I, for one, place no reliance on a private test if it is at all remarkable. Some doubtless are true, but many, I am sure, are false, and I have no way of distinguishing the two. In race horses, a public performance, with a disinterested party to hold the watch, and two or three other disinterested parties to watch *him*, is the only evidence the public accepts. And it is the only evidence we should accept in regard to a cow, unless the claim put forth in so very modest we may feel sure, if the party were lying, he would make it better.

Milk Yields.—Holstein breeders talk glibly of 80 and 90 lbs. of milk a day from many of their cows, and some even claim yields exceeding 100 lbs. in 24 hours. But they never enter their cows in a public test. No cow, so far as I have noticed, has ever given 70 lbs. of milk in 24 hours in any public test; and no cow has ever made two pounds of butter, in 24 hours under similar circumstances, except at the New York Dairy Show. At the last London Dairy Show thirteen Jersey cows were entered in the milk test, which lasted two days. Excluding two heifers, which the judges thought not in fit condition, the milk yield ranged from 39 lbs. to 80½ lbs. for the *two days*. The butter yield (also excluding two heifers) ranged from 2 lbs., 2⅛ ozs., to 3 lbs., 15½ ozs.—an average of 1 lb., 7⅛ ozs. daily.

Devons vs. Jerseys.—At the Ontario Provincial Exhibition last fall, the great Jersey breeder, V. E. Fuller, entered four Jersey cows, but was beaten by a general-purpose cow—a Devon. The Devon—Rose of Coburg—made a score of 112.06 points, against 97.89 points for the best Jersey. At the test in this state two years ago, under the supervision of Prof. Armsby, a grade Devon made the highest score both for cheese and for butter. The scale adopted was substantially the same as that in Canada, and Rosa—½ Devon, ¼ Shorthorn and ¼ unknown blood—made a score for butter of 93.47 points against 76.20 for the best of her competitors—a Jersey.

The General-Purpose Cow.—I refer to these public tests not for the purpose of depreciating the dairy breeds—they have their place. But that place is *not* in the hands of the general farmer; and when Jersey breeders, in lauding their favorites, sneer at the general-purpose cow as an absurdity, or physical impossibility, they are not sustained by the facts. In England a general-purpose cow—the Shorthorn has beaten all competitors in the milk tests. In Canada a pure bred Devon made the highest score of any cow tested; and in this state a grade Devon cleaned the platter with equal ease.

Merits of the Devons.—The Devons, it seems to me, are not appreciated as their merit deserves. For thin, or rough land they have probably no superiors. They are rather slow in attaining maturity, and do not attain so great weight as some others, so that thay have never cut much of a figure at our fat stock shows. But in England, where the taste is cultivated to the highest degree, their meat ranks next to the West Highlander in quality; and in their own district they are also esteemed for the dairy.

Devons as Milkers.—Many Devon cows, it is true, are indifferent milkers but many, on the other hand, rank at the very top in this respect; and it would not be at all difficult to collect a herd which would compare favorably with any in *profit* at the dairy. They do not milk so largely as some others; neither do they eat so much. Indeed, the Devon is, or could easily be made, almost the ideal general-purpose cow, for many locations, if it were not for her formidable horns. They have otherwise almost every desirable quality. They are handsome; they are hardy; they are easily kept in good flesh, and make beef of high quality, and they are, or could easily be made, very good milkers in proportion to food consumed.

The Red Polled Cow. — The latest candidate for public favor in this line, and to those who desire a hornless bree the only one, is the Red Polled cow, o

Polled Norfolk and Suffolk. Originally this was a strictly dairy breed; but of late they have been bred to combine good beef qualities also. Youatt, speaking of the Suffolks as they existed some half century ago, says: "In the height of the season some of these cows will give as much as eight gallons of milk in a day; and six gallons is not an unusual quantity." The gallon referred to is, of course, the imperial gallon, which holds ten pounds of distilled water; so that their yields would be equivalent to about 80 lbs. a day as an occasional yield and 60 lbs. as not unusual. The eighth edition of the Enclycopædia Brittanica, the highest authority on any subject, speaking of the old Suffolk breed, says: "The country of Suffolk has for centuries been celebrated for its dairy produce, which is chiefly obtained from a polled breed of cattle, the prevailing color of which is dun, or pale red, from which they are known as Suffolk Duns."

The Red Polls as Milkers.—The modern Red Polled cow does not, I think, milk so freely as the old Suffolk; but her milk is of better quality. Sixty pounds a day, which Youatt says in his time was not unusual, is now, I think, somewhat rare. Four to five gallons a day, or say 40 to 45 lbs. is, in my experience, a good yield for a mature cow in the flush of the season. But she will easily give, with proper care, seven to eight thousand pounds in a year. I have in my own herd a young cow which gave in her first milking season of less than ten months, six thousand five hundred and sixty-three pounds of milk, and another which gave over five thousand eight hundred pounds, and both came forth with second calf before they were three years old. The first officially tested at the W. Va. State Fair, was giving, seven months after calving, and six months in calf, a [illegible]ation over 20 lbs. of milk a day which showed 14⅛ per cent. of cream. A four year old cow tested this winter for butter, without any preparation, or any extra feed, gave at the rate of ten pounds six ounces of butter a week.

Milk Tests of Red Polls.—At the last Iowa State Fair, Gen. Ross, of Iowa City, entered a Red Polled cow in the milk test. According to the official report she gave, in the two days of the test, 77¾ lbs. of milk, which made 2.72 lbs. of butter. The celebrated Holstein cow, Tritomia, entered in the same test, gave 134 lbs. of milk, which made 2.97 lbs. of butter—just a quarter of a pound more than the Red Polled cow. At the last show of the Norfolk Agricultural Society, in England, in the class for Red Polls in milk, the test being the best dairy qualifications, the first prize was awarded Mr. Garrett Taylor's cow, "The Gem," giving five gallons, one pint of milk a day—say 52 lbs.—three months after calving. Mr. Gooderbani's "Strawberry" was highly commended, with a reported yield of six gallons, three pints of milk—say 66 lbs.—and 15½ lbs. of butter a week.

During a visit to the farm of Wm. Steele, in Waukesha County, in this State, he tested for me one of his Red Polled cows, recently fresh. She gave 42 lbs. of milk. I had no means of testing the quality, but it appeared to be very rich. Her feed consisted of one feed of ensilage and four quarts of grain (corn and barley) a day, with what she wanted of oats, straw and corn fodder cut together—no hay.

Red Polls for Beef.—As beef cattle, the Red Polls rank with the Devons, though they are somewhat larger, and mature a little quicker. But in form, color and general characteristics, they might almost be considered as Polled Devons, though, as a matter of fact, they have no Devon blood at all.

SUMMER FEEDING.

By H. C. THOM, Rock County, Wis.

Second Paper.

Raise More Grass.—Tame grass, timothy and clover, is conceded by all soil thinkers, to be a good thing with which to put neat fences around the farm, and paint on the house and barn, and secure a paid up subscription for an agricultural paper.

Then why not raise more grass? Pasture is better for land than meadow. Then why not more pasture? Wisconsin men grant that grain raising cannot be maintained year after year with profit. We have as good grazing lands as any in the States. Why not use them? Those who have been thinking and watching have concluded that their neighbors are not getting rich feeding cattle. Why? They might have done well in 1856. There must be some reason why they do not gather the dollars now. The truth is, we are paying a different fiddler now. Lands that our fathers secured for ten shillings an acre are selling for $75 now. We are wearing boots of another leather. The town assessor reports a watch now and then. Fresh meat has a pleasant smell. Our wives, God bless them, like music, society, dress. Labor has a tender skin, and the markets need a float. What does it all mean? We are trying to be like other folks.

A Problem to Meet.—Our fathers' lives were founded upon economic principles. Every out-go was met with most rigid economy. They labored from dawn till sunset. No rest. "Business" was a watchword as sacred as the blarney stone. The homestead came at ten shillings. They had few wants and no luxuries. Their plans made the farm pay. Nine dollars for pork, and seven dollars for cattle, was no uncommon thing. We have a different problem to meet. Land brings $75, a dollar and eight cents by the year. Old-time luxuries are present day necessities. We cannot farm as our fathers did, and make two ends meet. Grain raising is out of the question. Stock raising and beef-making is meeting with a Western competition that brooks no jesting.

Beef Cattle Interest.—The beef cattle interest of this country is assuming enormous proportions.

I could give statistics that would make Hoard's little Jersey cow swallow her cud in amazement. Some ingenious individual has estimated that a column, twelve abreast, would stretch in an unbroken line from New York to San Francisco. A large proportion of this vast army is grazing on government land, or land of nominal value, under a summer sun the season round. Every blade of grass is sweet and undefiled by trampling feet. They roam at their own sweet will, no fence to fetter their inclination, no bark of dog, or neigh of horse, to wake their dreaming but once a year. The herds are governed by foreign capitalists or home monopolies, and are thrown upon our central markets to compete with cattle which have been grazed upon high-priced land, stabled and fed six rigid months in a year.

Better Quality of Beef Demanded.—It is sharply apparent that we cannot meet this competition with quantity. Our only remedy is to out-rank it with quality. In order to do this we must put ripe, well turned steers upon the market and deliberately down them upon the ground of superior excellence. How can this be done with the least possible outlay of money? As you know, the usual method is to raise or buy calves in the fall, put them through the initial winter on hay and then turn them out to grass in summer. Repeat number one process during number two winter, turn them out again and the third winter feed them as best you can, and in the spring sell and grope blindly for a profit on a three years' investment. The price usually obtained is a fair one considering the class of cattle turned. Whether the price you get is one of profit is a question depending largely upon the grade and character of the stock handled, and the existing price of feed. Everything must act conjunctively in your favor or the balance will make you smart.

Winter-Fed Steers.—Another method is to buy two-year-old steers in the fall, feed through the winter and sell in the spring. Let us look at this way a moment.

A two year old steer weighing 900 lbs. costs $28 in the fall. He eats $8 worth of hay. For 150 days he eats 20 cents worth of meal each day, or $30, making the actual cost of the steer the 1st of May $66. If the average steer weighs 1200 hundred pounds on the 1st day of May, he has done as well as is generally expected; at any rate he has done fairly well. Say he commands $5 per cwt. (which he probably will not do), $60, a net loss of $6, allowing manure to pay for care, risk, shelter and interest on the investment.

E. W. Reese's Plan.—E. W. Reese of Illinois purchased, Nov. 1st, 40 steers, which after shrinkage weighed 1100 each. He turned them on good pasture. Dec. 1st he began to feed corn and by Dec. 15th had them on full feed. May 11th they were sold and weighed, showing an increase of 5,520 lbs. on the lot. He fed 2800 bushels of corn worth 33 cents, or $840.

At the time he began feeding he turned in 23 weighed hogs, making a net profit above first cost of hogs and cattle of $499.20, a net loss of 16 cents on every bushel of corn fed. The cattle were regularly fed, watered and salted. They had all the corn they would eat and were fed in boxes so that nothing was lost. That man's hay vanished like the morning dew, and no one knows the profit thereof.

Relate Your Experience.—If you want any more encouragement on this line, weigh your steers in the fall, weigh your feed, estimate your hay, sell your cattle by the hundred in the spring and see how large a hole there is in the pocket where the profit dollars ought to be; Then stand up like a man and relate your experience.

The Way Out.—How out of this dilemma? For an apparent reason I have but few figures to support the subject of this paper. There is always a theory before a practice, and always a practice before a figure. The reason that I have so few figures, is that I have seen but few summer fed cattle. How many have? I mean a graded steer running on good pasture from May until December on full corn feed at the same time.

Iowa, Kansas, Missouri and Nebraska have been feeding cattle on grass and corn at the same time, and they claim that it pays. But their estimates will not help us much. They don't weigh, as a rule; their climate is different. The most of their feeding has been done during short pasturage, when growing feed was short or dry or dead, and still they claim it pays. What I want is corn meal and luxuriant green growing grass. If they can make it pay under their condition of things, what's the matter with ours? The foundation to successful beef raising is good stock. Am I not right? The fancy stockmen who are present will convince you that blood tells without any aid from this paper. I will talk of cattle only, although nearly every statement regarding feeding applies alike to cattle and hogs.

Grain and Pork.—I received a statement a short time since from a good authority which said: "If we were to take all the hogs fattened in the United States in a year, and change the time from cold to warm weather, one-half of the grain now fed will make all the pork. This would be a saving of $75,000,000 annually."

Care of the Calf.— The key note to rapid cattle growth is good care of the calf during the first winter. Have a warm, comfortable place with a dry floor, give him liberty, good hay, ground feed two or three times daily. Let the main part be oats, the remainder barley or corn, with a little oil meal. The calves will walk out in the spring with the bow of an ordinary two-year-old. They have growth and frame. They are bright-eyed and active, have straight backs and the hair lays well. Then comes the grass. Wisconsin grows good grass. We would not have a butter and cheese record if she did not. Our timothy and clover have no equal as a meat producer.

Care of the Yearling.—These yearlings begin their second winter, stalwart fellows whose limb and barrel begin to show the round and graceful contour of maturity. For the second winter a tight shed on three side, open to the south, kept well bedded, answers every purpose. A manger on the inside of north, east and west, will do for the hay. It may have a grain box attachment, or a feeding box in the yard will do better, perhaps. Would feed enough to keep them in good growing condition. When grass is ready would arrange feed boxes in the pasture. It is not a good plan to turn 50 head of cattle into a hundred acre field to hunt for a white livered spear of grass that trembles as it looks around in fear that it has made a mistake in the season. By judicious feeding would have them on full feed in fifteen days, and keep them there until some man comes who has an eye in his head for something young, clean and fat at a fair price.

Two-Year-Old-Beef.—Two-year-old beef is too young for market, as we raise it. A three-year-old costs too much. Did you ever hear a man say that a three-year-old ate his head off the last winter he was fed. Our summer fed steer is going to drop right into that big hole between the immature beef and a three-year-old with his head eaten off. He is two years and six months old and will cover the block before the third and fatal winter comes. He has a free and easy action. He is not strained by dry hay and dry corn. You have not an eager, pushing, hungry and frozen animal to feed all winter. Cattle lice don't mow hair and corn at your expense. You don't pitch manure out of the back door every winter morning to run over on your neighbor's farm next spring. You don't spend three or four weeks of beautiful weather drawing out the husk of manure that is left after Jones gets the meat across the line. You are not feeding 60 per cent. of your grain and hay that you may maintain a fire, that your charge may live. If you do not carry these hulking, hungry fellows through the winter, the hay you save is a clean, salable product of your land. Hay pays about as well as any plant grown on the farm.

How to Make a Good Steer.—After you have a steer through the second winter, in an off-hand way that looks toward liberty and comfort, you have growth, frame, and condition to start on; a summer sun, quiet shade and tempered water to aid you; green and succulent grass that is infinitely better than any mow or silo can furnish; a climate and condition of things that will make more than two pounds of meat, where you made one on the same feed in winter. Sufficient feed to keep an animal from losing in winter, will fatten him in summer. Your manure is of number one quality, well distributed, without waste or labor, and above all you have a steer that *is* a steer. In symetry of outline, in maturity, in fat, in handling quality, in every point that goes to make up a butcher's pride, you have a living example that will make any lousy, half-haired, manure-bedaubed, winter, stall-fed steer crawl into a hole that his summer friend can't get into by 400 pounds.

The Great Drouth of '87.—Wisconsin suffered, as no part of the north central states suffered, last summer. Last year I cut four tons of hay to the acre; this year I did not set up the mower. Ground that yielded 58 bushels of barley to the acre, was not worth the cutting this year. Our pastures were white as the Sahara, and the shimmering waves of heat arose from their panting bosoms to the sun again. Conservative farmers stood aghast. What was to be done? Hungry, lolling cattle panted and lowed about the tanks. Nothing to eat. No protection from the burning sun. Cattle run down. Cows dried up. Meadows, grainfields and cornfields were thrown open. Trees were burned to the trunk. Sheep were given away and driven from the country. Cattle were turned into brewery yards, and still many were left. Human sharks fell upon the poor farmer, and the cattle had to go. One dollar per cwt. bought them, kept from feed and water 12 hours and then driven 10 miles to weigh. Good milch cows changed owners at from $7 to $10 each. Good grade two-year-old steers went crying for buyers at $12.

Summer Feeding.—I was no less alarmed than my neighbors. I had determined the preceding winter to feed in the summer when my usual pasture had succumbed to the drouth. I opened the meadow gate. When the meadows were gone I shut the cattle in the barn from six in the morning until sundown, and fed them green stalks and corn meal. I found them too lax and regulated with bran. When night came I gave them liberty and exercise. They would not drink more than a small pail of water each, at noon time. I never saw cattle do better. The 9th of August I sold them for $4 per cwt.—the 9th of August when the sun was as unrelenting as fate. Falling water was a stranger to the thirsty earth, and clouds had been forgotten by the anxious husbandman. I weighed the cattle when I turned them out in the spring, and again when I sold. I knew the amount of corn fed, saw a profit and let them go. If one can make money on cattle, when the market is going down every day, with the elements against him, and the earth bearing nothing, the assumption seems safe that money can be made on cattle under favorable circumstances.

Get Out of the Rut.—Why have we not tried this method before? We are conservative. Our fathers fed the old way and did tolerably well. Some of them put a stone in a bag to balance a bushel of wheat across a horse. Need we? They had the advantage of us too. Land was cheap. No Western competition. Their wants were few. Why don't we believe as they did? What's the use of being a Roman? We are a sort of hand-to-mouth tribe. If we can make grain and hay last until hay grows again, we draw a long sigh of relief and begin the new year with the old leaf fluttering to the wind as ever before. Because corn costs 24 cents to produce it, it is no evidence that 24 cents is all it is worth. Buy corn if cash and credit do not blush to meet you. Buy corn until you get a start, and when you get your start sell your hay and stay started. If your corn has a market value of 40 cents and you can get more than 40 cents by feeding it, you can make a profit on your neighbors' corn at 40 cents. Manure your land with some one's else grain who does not see as you see. The more grain of any man's raising that you can feed, the more cattle you can keep on your pasture.

Good Beef Wanted. — Stockers, feeders, scalawags, old cows are sold to third rate butchers or hurried to the stock-yards. Bargain drivers are willing to minister to your wants. Our summer steer is not a competitor of this class of cattle. Neither is he a competitor of the great flood of Western cattle. The local respectable butcher must have some good beef to sandwich with the great fall's clearing. He is willing to pay something near a fair figure for something to justify his pretentions. He wants a good quarter to hang on the first peg next the door.

Turn to a summary of market reports for the past twelve years, and you will find many of the November and December quotations low.

Grain Fed Cattle.—Pastures will support a third more grain fed cattle than they will if they are unfed. And when your plow glides under the rich green sward and you ask your farm to stand by you in an emergency it will respond like a thing of life.

You may say cattle don't bring anything in the fall. Very good. As a rule they do not command a very high price, that is such cattle as are usually turned off.

Fat Not Big Cattle Wanted.—Short-sighted farmers are appalled at the sight of snow. They have miscalculated. No room. Unexpectedly short crops. Money close. Tax time near at hand. Cattle unfitted for market. No preparation for this emergency. They must go. But near the top you will find good cattle bringing good prices. We make a mistake in fitting cattle for the market; not big cattle but fat cattle. Don't keep a steer three or four years to make him big; I know you like to have your friends come over and see something big, but it is expensive pride. If you can combine size and finish, so much the better. By all means have them fat, if you want the top price. This fall's quotations showed 1,200 pound cattle bringing more money per cwt. than 1,200 pound steers. For this class of cattle the November and December market rarely falls below that of March or June, and often outranks it. Will the plan work? Try it. Any plan that has in view the hanging of a good quality of beef on Chicago and New York hooks at a fair profit, is worth the trying.

Discussion.

MR. KNIGHT.—Is it more profitable to sell those cattle at fourteen months than at thirty months?

MR. THOM.—The thing is, we are meeting the wants of the market. It is not heavy cattle that the market wants now, it is well finished cattle, that will weigh 1200 or 1300 pounds rather than those that weigh 1900. It is the finished steer that we want, the steer that is well made, that is young, and fat distributed evenly over the body.

MR. HARDING.—I found it paid better to turn cattle on old pasture than on clover and timothy.

MR. THOM.—I arrange that matter with bran. I have never had any clear clover pasture. Timothy predominates in my pasture, but one of the features that made me begin this line of feeding was that if the cattle were taken off the dry hay and corn in the winter time, and turned out on the pasture without anything, loss was sure to follow. I never have had steers that refused to eat. You will find the feed vary according to the amount of dew or wet on the grass, different days. Sometimes they will fill up and eat scarcely anything, but as a rule they will feed right along. That is verified, too, by dairymen who find that cows take to the grain feed as readily as they do in winter. If you have a straw-stack in the summer, it is good to let them run to it, and a little hay. I fed right along without roughage.

PROFITS IN BEEF PRODUCTION.

By A. A. ARNOLD, Trempealeau County, Wis.

Third Paper.

Requisites Required.— Profits in beef production depend upon the quality of the animal, the quality of the food and the quality of the care. A neglect of the requisites in either of these will as surely diminish or totally dissipate profits, as a neglect of either will in the production of butter or cheese.

Lands and Labor Too High. — Lands and labor are too high in Wisconsin to permit slovenly methods in any kind of husbandry. Nice, tender, juicy, deep-fleshed and marbleized beef that suits the appetite of the epicure always finds a ready market, usually at paying prices; probably with less fluctuation than any other commodity that can be named. Therefore the farmer who has an eye, the taste and the art, for making fine beef, if he will observe the requisites, may make it as profitable as any other branch of animal husbandry.

Values Compared. — I submit an estimate of the value of the various parts of two steers of equal weight, showing their total value when on the block. I will first name the parts of the ill-formed steer, and then the well-formed, with the proper weight and value of each part, and then the total value and the difference in the value of the two steers. From this it will be seen that the valuable meat lies in the hind quarters, the parts that are poorly developed in the scrub. It will be seen, also, that the poor steer dresses fifty per cent., and the good steer sixty per cent. of their respective gross weights. The total weight of each steer is figured at 1,400 lbs., which is heavy enough in each cow to bring first price in beef markets, prices varying more than this, as between light and heavy weights.

Hind Quarters.

	Ill-formed Scrub Steer 1400 lbs., dressing 700 lbs.			Well-formed grade 1400 lbs., dressing 840 lbs.		
	lbs.	*per lb.*	*Am't.*	*lbs.*	*per lb.*	*Am't.*
Loin..........	117	15c	$17 55	192	20c	$38 40
Round..... ..	65	10	6 50	100	15	15 00
Rump Roast..	20	8	2 40	86	10	8 60
Flank	24	5	1 20	24	6	1 40
Soup Bones..	36	2	72	36	2½	90
Kidney.......	12	1½	18	12	2	24
	284	.....	$28.55	400	.....	$59.54

Showing a difference in value of $30.99 in favor of the good steer.

Fore Quarters.

	lbs	*per lb.*	*Am't.*	*lbs.*	*per lb.*	*Am't.*
Loin Roast...	70	10c	$7 00	90	12c	$10 80
Shoulder " ..	175	8	14 00	185	10	18 50
Boiling Meat..	95	5	4 75	89	7	6 23
Neck...... ..	40	4	1 60	40	5	2 00
Soup Bones ..	36	2	72	36	2½	90
	416	.. ..	$28 07	440	.....	$38 43
Offal........	700	1	$7 00	560	1½	$8 40
Total.......	1400	.....	$63 67	1400	.....	106 37

Showing a difference of $10.36 in favor of the good steer—a difference of $42.75 in butcher's value, and from two to four cents per lb., gross weight, in the Chicago market, no matter whether price of beeves rules high or low.

Quality of the Beef.—The quality of the beef depends first upon the quality of the animal. The steer must be born of a beef producing race with well developed crops, loin and ham. These with well arched ribs, a bright intelligent protruding eye, a good broad muzzle, a short head, a long broad loin, soft waxy looking horns, a mellow skin, a thick fine coat of hair, and built well down to the ground, will indicate a good feeder, with meat where it is wanted, which means an animal machine with a good constitution, good nerve organism and good digestion that can assimilate a large amount of food.

Quality of the Food.—The quality of the beef also depends upon the quality of the food. In the young animal the feeder must look to it that the food be of a highly nitrogenous quality, thus giving an opportunity for the growth of bone and muscle, for the animal cannot elaborate or utilize what is not in its food. The first care of the stockman should be to produce a good frame of bone and muscle on which to build the useful animal of any kind.

The Finishing Off—Must be done as rapidly as possible with more carbonaceous foods so as to marbleize the beef by filling up the tissues between the muscles with fat; distributing it well through the system, giving the animal a smooth and not bunchy appearance, just the thing to please the epicure, but not the best process to produce the most valuable breeding animal. The succulent grasses, with a grain ration, give the most satisfactory returns in gain of pounds, for thereby there is more water secreted in the flesh, a condition most satisfactory to the producer because the most profitable, and the most acceptable to the consumer because the most palatable. When grass is not obtainable, ensilage or roots form good substitutes, and will promote rapid growth in winter.

Early Maturity—Is most desirable, for on this, in a great measure, depends the profit, and quick returns. It costs nearly twice as much to make a pound of beef the second year as the first, and he expense is constantly on the increase as age advances. Young, quick-made beef, and that in the right place and quantity, can only be made with well bred animals or their crosses, and by keeping the animal machine constantly at work utilizing its food.

Profits in Feeding.—The profits in feeding consist in what the animal appropriates in flesh after sustaining life, so that when only enough food is given to support life there can be no profit, and all profit comes from what is consumed and appropriated above the life sustaining point.

Care, Handling and Exercise—Has much to do with the growth and welfare of the animal. Upon the condition of the nervous system depends its profit, for we see that no animal thrives and produces well in any form unless it has a good nervous organism, and this cannot be well and evenly sustained without kind treatment, good air and proper exercise. At the finishing off but little exercise is wanted, but it should be voluntary, with little effort on the part of the animal to get its food, and so arranged that a mixed and liberal diet can be obtained at will.

Food is best assimilated when taken as the appetite craves, and no person can dictate the quantity and quality so well as the animal itself. Any kind of food, no matter how rich, is valuless to the animal, unless partaken of with a relish, for at such times alone do the organs of digestion and assimilation perform their proper functions.

Muscular Animals—Are the most valuable for food. Muscle when eaten produces bone and muscle, while fat keeps up animal heat, or again forms fatty or dead fiber. Muscle is emblematical of life and utility, while fat is only indicative of consumption—a burning-out or death. Muscle is inherited and can be developed by food only to the point limited by its heredity, beyond which it can only be developed by exercise. Fat may be increased at expense of muscle, as we often see where there is a lack of exercise. Fattening is the first step toward disease, and if too long continued will finally end in disease and death. Therefore quickly fattened animals are the best and healthiest, and bring the best price in the market. Where the climate is not too severe there is no doubt that open air is the most healthy, and therefore the most profitable; so that when this is not practiced we must approach in this regard as near as possible to natural conditions, which are pure air, nutritious diet, with water and exercise at will. Beef made in this way is the best and most healthful and, everything else being equal, brings first prices.

The Well-bred Steer — Responds best to liberal keep, and can be made to weigh as much at 20 months of age as the scrub will with same opportunities in from two to three years, thus saving in food, and in time from four to sixteen months. The good grade, or full-blood Shorthorn steer, will, with proper food and handling, yield as good net returns as the well-bred cow, while the scrub steer, with poor keep and handling, will not do better, if as well as the ill-bred cow with scrub management.

No Room For Scrubs.—There is no room for scrub management or scrub steers in Wisconsin. The farms of the West can furnish all that is wanted of these at less cost. In the best there is profit; in the poor there is loss. In the best the farmer can take pleasure; with the poor he feels his inferiority, and deplores his poverty. Farms on which steers are fed for market are constantly growing richer, making them banks of deposit, which will always honor the drafts of the depositors. The liberal feeder is the well-to-do man, a pleasanter man to live with—the man who laughs the loudest and lives the longest.

MERITS OF THE JERSEY.

By T. L. HACKER, Dane County, Wis.

Fourth Paper.

A Great Source of Wealth.— As dairying in this State is becoming one of its greatest sources of wealth, it is a matter of the utmost importance that the cow employed shall be one that shall produce the greatest amount of butter or cheese for the food consumed and labor employed.

The Ideal Dairy Cow.—The friends of the peerless Jersey believe, that to all practical and unbiased minds, she has solved the problem; indeed, she is now generally recognized as the ideal dairy cow. A scrub or native cow requires the same feed and care that the thoroughbred does, and, while there are some good milkers among them, the majority do not pay for their keeping, and the dairyman who keeps them, when the improved breeds are so reasonable in price and so much more profitable, is a long way behind the times to his great loss.

What Jersey Blood Will Do.—To illustrate what an infusion of Jersey blood will do: In 1875 Mr. Mowry's herd of native cows averaged 125 pounds of butter per year per cow; in 1880 the herd consisted of grade Jerseys, and the average was 187 pounds per cow; in 1886 they were one-half thoroughbred, the rest grade, and averaged 276 pounds, and the following year reached 300 pounds per cow. It should be borne in mind that the food of support was as great during the first period, above mentioned, as it was during the last, that is, it took just as much feed to support the 125-pound cow as it did the 300-pound cow. Herein lies one merit of the Jersey.

Richness of Jersey Milk.—Another point in her favor is the extraordinary richness of her milk. I do not remember a single instance where it required more than 20 pounds of milk to make a pound of butter, and there are instances where 3½ pounds of milk only was required to make a pound of butter. It also requires less time to milk and care for three or four than six or eight gallons of milk which is quite an item on a farm, and it is a manifest absurdity to use a cow for hydraulic purposes when a pump would answer every purpose at far less expense.

As a Butter Cow.—The Jersey has become famous as a butter producer, through the large number of authentic tests, which, large as the list is, falls far short of doing her justice, as comparatively few have ever been tested; of these there are some fifteen with yearly records ranging from 511, to 936 pounds of butter. This is the only dairy breed that having been "bred up," to such an intensified dairy animal, will endure such a prolonged test without showing an indication of putting on flesh, or in shrinking in butter product.

Large Yields.—We have 18 cows with monthly tests ranging from 64 to 112 lbs.; there are at least 7 cows with weekly tests of 30 to 46 lbs.

Of the group yielding 25 and under 30 lbs., we have 15; of the 24-lb. cows, we have 6; of the 23-lb., we have 12; of the 22-lb., 16; of the 21-lb., 21; of the 20-lb., 30; of the 19-lb., group, we have 42; of the 18-lb., group, 60; of the 17-lb., group, there are 100; of the 16-lb., group, we have 182; of the 15-lb., group, there are 237, and of the 14-lb., group, 400 tested cows. How many untested Jersey cows are there that can exceed 14 lbs. of butter in seven days? Probably more than a thousand in America.

Many of these large yields were made without any grain feed, while others received only a small ration.

As a Cheese Cow.— Another merit has our ideal cow in her ability to make fine cheese and more of it than any other. In every public trial where she has come in competition with other breeds, supposed to greatly excel her in cheese at least, she has beaten them one and all, absolutely and entirely.

Summary.—To sum up her merits: She is by far the best milch cow, giving a uniform flow through the year of the most delicious milk. Best for cream, because, she yields a large amount—rich in butter fats and superior in texture. Best for butter, because she gives the largest quantity, with the finest grain, the most beautiful color and delicate flavor. Best for cheese, giving milk so admirably balanced in fats and caseine as to yield the largest percentage and of the finest quality. It has been established that the Jerseys earn more money for the food consumed and labor employed than any other breed.

Jersey Blood.— So then, it is for the best interests of our farmers to have an infusion of Jersey blood in their herds, and the best way to secure it is to use thoroughbred sires from good cows of good family. A "phenomenal cow" in his pedigree would certainly do him no harm, as "blood will tell."

MERITS OF THE SHORTHORN.

By GEO. HARDING, Waukesha County, Wis.

Fifth Paper.

Fertility of Farms.—In my talk on the merits of the Shorthorn as a breed, the future fertility of our farms will be one of the main considerations. The present profits, although equal to other methods of farming, will be looked at as tributary to the future. I have nothing wonderful to say, but hope, from my twenty years' experience in cattle, that I may say something that will be of interest to those of you who aim to make money with farms under conditions that I think Shorthorns will meet better than any other breed of cattle.

Value of Pure-Bred Cattle.— The value of pure or line-bred cattle over those miscellaneously bred, is in the uniformity of their descendants. In placing any commodity in the market our first aim should be quality, next uniformity; and we cannot produce uniformity in cattle without using a standard breed that is known to produce the desired quality.

Shorthorns for Beef. — Shorthorns for the production of beef stand second to none, as we find them as long ago as 1600 in the valley of the River Tees. They were then noted as a grazing beast and dairy cow, although the attention of the world was not called to them until about 1800, when, through the enterprise of the brothers Robert and Charles Collings, prominent breeders of that day, animals, wonderful at that time and even remarkable at this, were traveled by them over England, drawing the attention not only of those interested in cattle husbandry in England, but also representative Americans, which led to numerous importations to America.

Dairy Qualities.—Among other English gentlemen whose attention was brought to them at this time, was Jonas Whittaker, of Yorkshire, Eng., a large manufacturer, who from necessity was seeking a dairy animal to produce milk for his operators, and proceeded to collect a choice herd, chosen from the best families and noted for their dairy qualities; and individuals from his herd were afterwards imported into New York State, and laid the foundation of that State's reputation in the dairy. That the dairy qualities of Shorthorns in the hands of Whittaker and Thomas Bates were not a detriment to them as feeders, is shown by the success of these gentlemen in showing animals of their best dairy families in competition against all other breeds in the prize ring.

Early Importations. — Shorthorns, when imported to this country from 1785 to 1800 in the East, were commonly spoken of as the "milk breed," and in fact were transported to Kentucky, under that name to designate them from cattle of other breeds, brought in about the same time; but while making the reputation of New York as a dairy State, they were surpassing all other breeds in Ohio and Kentucky, in furnishing a first class beast, that the enterprising cattle men of that section were enabled to drive over the mountains and compete at a profit in the New York market with any competitors.

Breeding for Beef Only.—There is no doubt that Shorthorns have been bred in the West for beef only, to the detriment of their dairy qualities, but in my opinion it is not necessary to sacrifice the milking quality of the Shorthorn to produce an animal that is a first-class grazer and a producer of first-class beef.

Points of the Beef Shorthorn.— The Shorthorn that has been bred for beef in comparison with the dairy type carries a large proportion in the front quarters, whereas those bred on the other model are much heavier in proportion in the hind quarters, where we find the most valuable meat.

As we all know that the butchers make a difference of from one to one and one-half cents per pound between the forward and hind quarters, I commend the Shorthorns to the farmers of Wisconsin as a breed that will mature early, furnish the best quality of meat in that portion of the carcass which sells at the highest price per pound.

For the Home Dairy.— The heifer calves, if properly bred, will mature into cows that are second to none at the pail

The farmer with 200 or more acres of land located too far from the factory to make cheese-making profitable, and not wishing to be a specialist as a butter maker, will, in the Shorthorns, find an animal that will consume the rough feed of such a farm at a profit, and also respond to grain feeding equal to any other breed of cattle, and when we add their superiority for the dairy over the other beef breeds, I feel safe in advising the farmer located as above to examine carefully their merits, as I believe the future profits of such a farm will be controlled by the selection of the breed of cattle best adapted to meet these requirements.

Value as a Sire.—The value of the Shorthorn as a sire to improve the grade cattle that now largely occupy our farms, cannot be over-estimated. The apparent improvement in the feeding quality of their grades, and that they seem to retain the milking quality of the dam, are remarked by all those familiar with the subject, and when such grades have come into competition with the gilt-edge dairy breeds, they have surprised their competitors with their remarkable performance, and often carry off the prize over animals bred for generations for the dairy. The steers from this same cross have carried off the highest honors when in competition with the best pure bred animals of the different beef breeds.

The last two seasons the product of the dairy has been high as compared with beef, but all know, who have paid attention, that it is only a matter of time when we are likely to see the reverse—in fact, we already have an improvement in the price of cattle.

Make Changes Carefully.—In closing I would say to those who are following a certain plan, do not change without careful investigation, for the farmer who is controlled by the fluctuations of the times will generally do business at a loss.

Map out a plan best adapted to your farm and surroundings, follow it steadily, using the best animals you can obtain in your chosen line, and those of you who are ambitious to improve the fertility of your farms, I would advise to examine the merits of Shorthorn cattle, and mutton sheep as an accompaniment. And too my fellow breeders who believe that the beef type of Shorthorns should be our aim, I would say, beware of sacrificing the grand old type of Shorthorns, that when on the butcher's block carried off the carcass prize by the wealth of high priced loin, in comparison with the low priced brisket.

MERITS OF THE HOLSTEIN.

By JOHN URQUHART, Columbia County, Wis.

Sixth Paper.

Origin of the Breed.—The remote origin of the Holstein breed of cattle affords a theme of unlimited speculation, according to tradition. However, as stated by the best authorities, all that is certainly known of this breed of cattle is that, for an indefinite period anterior to the records of history, there existed a superior breed of cattle in the Duchy of Holstein, in North Holland and Fries-land. To give you some idea of the antiquity of this breed of cattle, I will quote from a French historian who wrote in 1350: "As we besieged the enemy, we had to get our supply of butter from Holland." That country had been famous for its dairy products for 500 years prior to this time. The historian, Motley, in the seventeenth century, says that the most famous cattle in the world are those of Holland for milk, butter, cheese and beef. It is exceedingly difficult to obtain trustworthy information relative to the various races or breeds of cattle on the European continent. It is known that for over 200 years Holsteins have been imported to England to improve the stock, for the people very early appreciated the pre-eminent dairy qualities of this breed, as they had been bred for so long a time for milk, butter, cheese and beef. But their main staff of life was the butter and cheese. Breeding for this one purpose, none but the fittest survived. All the poor stock was sent to the shambles. The people lived with their stock and attended to their every wants, for they derived the most of their sustenance from the cow. She had the best of care, and, as you know, care, feeding and breeding make the cow. This long line of breeding, and the best of care, have developed a breed of cattle that has no superior for the farmers, to-day.

Holsteins in the United States.—There had been a few of these cattle imported into the United States as far back as 1625, but they were not kept pure, so that they soon became extinct by crossing with scrubs. There were several subsequent importations, but were not kept pure. In 1861, Mr. Chenery, of Massachusetts, imported one male and four females, which have been the foundation of the Holsteins in this country. They made very slow progress the first 20 years after their introduction, but as their merits became known the demand for them increased. In 1881 there were 2,782 registered Holsteins in this country, and now there are about thirty-four thousand, a wonderful growth in seven years, and, I think, merited by this noble breed of cattle. They are scattered from Maine to California, and giving the dairymen the very best satisfaction; there are a number of the bulls used on the ranches with the very best results. As they are good rustlers, strong and vigorous, their grades are thrifty, and mature early.

Prepotency.—The strong prepotency of the Holstein is a marked feature of this stock wherever introduced; you will almost always find the grades black and white. The first bull that I bought in two years got 223 calves from a promiscuous lot of cows, some of them being registered.

Every calf was black and white. I never saw or heard of a red calf from any stock that I sold.

Blood Will Tell.—In the Holsteins, we have a grand dairy breed of cattle, and I hope breeders will not lose sight of their dairy qualities, go to breeding for beef, and spoil this grand breed that has been brought so near perfection for the dairyman. A combined machine never works well; profit by the experience of others, and don't try it. I don't believe in a general-purpose cow, but I do believe in taking all the purpose out of stock that is in them.

Grades.—The grades of this breed are used in most of the great butter and cheese localities in this country with great profit to their owners, as they give a large flow of good, rich milk and are very persistent milkers. The steers fatten easily and fully as cheaply as any other stock, which has been demonstrated by disinterested parties. I believe that the Holstein breed of cattle will produce a greater number of profitable cows, thoroughbreds and grades, than any other breed that I know of.

Milk and Butter Records.—I might quote you almost phenomenal milk and butter records that have been made by this breed of cattle. Just think of a cow giving 2600 lbs. of milk in one year, and 100 lbs. of butter in one month. A few years ago you couldn't get any one to believe that a cow could be made a machine to produce that amount of milk and butter; but we had to wait for a Holstein cow to do it. The Holstein cow is well fitted in her nervous make-up, to make these large records, as she does not waste her nervous energy in chasing real or imaginary shadows, but devotes her time in asimilating the food consumed in making milk to make butter and cheese, which means dollars and cents for her owners.

Sensational Records.—I don't believe in over-feeding and crowding to make sensational records. There are more good animals spoiled by overfeeding than we are aware of. Feed your stock well and regularly and you will get the best results, and the stock you sell will give the buyer the best satisfaction, as they will have a chance to improve on his hands.

Skim-Milk Cows.—The Holstein cows have been facetiously called skim-milk cows, but you will also find it true that wherever they have been publicly tested they have invariably beaten their competitors in giving more pounds of milk, more pounds of cream, more pounds of butter, and, if you will, more pounds of skimmed milk, which, by the way, as Prof. Henry says, is worth nearly 90c. per hundred, if fed with corn, to make pork. The skimmed milk of a good Holstein cow, fed as above, will make more dollars and cents than three-quarters of the cows in Wisconsin will average this year in milk and butter.

At New York Dairy Show.—At New York, last spring, the greatest dairy show in the United States or Canada was held, and the very best cows that our country could produce were marshalled there in battle array, every one thinking his favorite the best. There was a golden cup, on which was engraved a cow, to be presented to the owner of the best dairy cow at the show. The Holstein filled the fondest hopes of her admirers, by winning first, second and fourth, and within one oz. of winning third—almost four premiums out of the five offered. She also won the golden cup and filled it with honor until it overflowed. Not much skimmed milk about that cup. This is a wonderful record to make when we take into consideration that there were the best cows in this country that the Holsteins had to compete with. This is only one of the many victories the Holsteins have won. I might quote you others in quantity and quality of butter at other shows and tests; suffice it to say that the Holstein cows of this country will produce more 20-lb. or over butter cows than all the other breeds combined.

Merits Enumerated.—It is true that one robin don't make a summer, but when they are scattered all over the land summer is here. The Holstein cow has merits in her large flow of rich milk, and its good keeping qualities; in her fine flavored butter, and its good keeping qualities, commanding highest market price in the best markets. The Holstein cow has merits in her kind disposition; in her strong constitution and strong prepotency in impressing her characteristics on other stock. She has merits at the pail, at the churn and at the cheese vat, unsurpassed by any other breed. She has qualifications that commend her to the farmer, to the artisan, to the preacher, to the lawyer, to the general, to the governor—in fact to every one who admires a good and profitable cow. The Holstein cow has won laurels in her native country; she has won gold medals and honors in her adopted country. The cry comes from over the sea, and is echoed through the length and breadth of our land, crown the Holstein cow queen of the dairy.

MERITS OF THE JERSEY.

By GEO. E. BRYANT, Dane County, Wis.

Early Predjudices.—At the first convention held by the Wisconsin State Agricultural Society in 1875, I read a paper on Jersey cattle, published in Vol. 41, of the transactions of said society. After I had read it, George E. Morrow, the organizer of farm institutes, advised me *not* to hand it in for publication, because, he said, it was too bitter in its sentiment. I replied, that if I had stepped on any man's toes, I was glad of it; I meant to do it. The Shorthorn men—Stilson, Ludington, Williams, held up their hands in holy horror, when I proposed that the Jerseys, which two years before they had laughed out of the premium list, should be put on a par, in fairness and in merit, with Dukes and Duchesses. The only men who commended the paper were Dr. Horne, Gen. Geo. P. Delaplaine, and the editor of the Jefferson County Union. Fifteen years have passed around, and Hiram Smith has ceased to make butter from "dunghills." He came to the Jersey slowly. He tried Hazen's Ayrshires, and found that gristle was not what he wanted; he tried the Holsteins, and found that a soup cow was not the machine for making prize butter. Hiram was more honest than Hazen, for when he bought him a Jersey bull he frankly said he was going to raise some grade Jersey heifers.

Changes of Fifteen Years.—Favill, an old-time dairyman, an honored man, kept saying for years "that cheese came from clover and bran, and it did not make much difference what the breed was that chewed it." I am told that a breeder of Shorthorns—who to distinguish himself, rushed into print some years ago to abuse my cattle—has all grade Jerseys now, including his bull. Fifteen years have worked great changes. The Jerseys with their horns on don't have to fight for their rights at fairs. They have beaten all other breeds in daily, weekly, monthly and yearly butter production. You see their profiles on milk wagons, cream jars, cheese tubs and butter firkins. They are the pride of the rich, the joy of the poor and the money-gatherer of the dairyman.

Heredity.—What is her bane? Solid color craze, grade Jersey bulls, phenomenal cows with *no* heredity, and dishonest men and women! The only question in the selection of a bull, by the most judicious Jersey farmer was, "is the bull a good one," meaning solely had his progenitors, near and remote, been renowned for their milking and creaming qaulities; had he an heredity that was safe to build on? To-day too much stress is put on solid color, black tongue and black switch. Some insist that his mother must have been a great milker, and if she was, stop there and are satisfied. *Heredity* means more than that. You want of the family that are *all* great milkers. Don't bank on a great grandson of a purely phenomenal cow, with little other backing; but rather put your trust in the family of creamers. Place not your faith in pictures, and weigh well the words from the silver tongues of men and women in high places. Samuel J. Tilden's Jerseys were pretty to look at; Jersey Queen of Burnett was speckled, but the hills of Vermont graze many of her descendants that are renowned at the pail.

Grade Bulls.—Grade Jersey bulls have spread over the country and greatly injured the good name of Jersey. Poor, ordinary cows, called Jerseys, are getting too common—a half-blood and a quarter-blood, bred together, producing a scrub, and most times a poor scrub.

"Omaha."—I once owned a bull called Omaha who became somewhat famous as a getter of great creamers. He has been dead eight years, but if any of you want Omaha yearlings—two-year-olds or three-year-olds—let it be known and you can find them. There are hundreds of them in this country, and as feed is scarce they are for sale cheap. "A good name is rather to be chosen than great riches," and that is the reason so many insist they have Omaha's daughters. Speed comes from the Arabian horse. Why?—because since God made the horse he has been bred by the Arab for speed only. The island of Jersey is within daily communication with the great markets of Paris and London. The island is a great garden, and the surplus of its vegetables for generations has been food for cows, persistently bred for cream not beef. There is heredity in the Arab horse; there is heredity in the Jersey cow. Do not condemn and find fault with her because some people mongrelize her. Breed her up and not down, and she will pay big interest on her keep.

"Badger Girl."—N. N. Palmer's Badger Girl is a great cow. Why?—because she has inherited from sires and dams, near and remote, her creamy qualities. Some years ago a Wisconsin horse breeder said, "the fun in breeding is the uncertainty of it." Cow breeders don't want uncertainty; they want to be sure of a "creamy" heifer every time. Now Mr. Palmer is sure of a cow that will make two pounds of butter per day every time Badger Girl has a heifer calf by his bull Gold. Why is he sure? Because Badger Girl made it; her dam Fanny Badger made it; her granddam Metah's Queen made it; and her great granddam Metah produced a half dozen daughters that made it. Gold is from a cow that made it. I have made the above illustration to show you an established heredity, and that is what the breeders of Jerseys should aim for.

Quit Breeding Scrubs—For blood will tell. Do not dishonor them. Let the "muleys" do the bunting. Breed for cream and not for color; breed for families of creamers, and not go wild or let yourself be fooled over a phenomenal cow, for blood will tell when records fail. Shun a grade bull as you would the devil—he is a horned evil. Be honest in your deal, and don't claim your cow makes forty pounds when she only makes twenty. Lies will not help a Jersey. She is honest as were her first breeders, the followers of King John.

MERITS OF RED POLLED CATTLE.

By E. W. KEYES, Dane County, Wis.

Seventh Paper.

A Progressive Age.—In this day and age, when there is such an extraordinary reaching out for the attainable in science, literature, and art; such a growing desire among the farmer class, for the best improved methods in agriculture; such a progressive spirit among the people, inspired by a determination to devote the necessary time and money for the better education and higher enlightenment of the producing classes, it is but natural that every new idea that points in these directions should be received with great favor, and be at once submitted to the crucial tests of investigation and experiment.

During the last decade such a great advance has been made in scientific agriculture, in applying the highest principles of art and skill to the processes of dairying, and generally to the successful development of thought and action, sure to result in benefit and advantage to the farmer, as to be almost wonderful.

A Question of Breeds.—While all this and much more has been going forward, the attention of the stockman has not been idle, and the farmer has not lost sight of the great question of cattle breeds, and the subject at present of paramount importance with farmers in relation thereto is, which breed is able to present the best general purpose animal. Perhaps the problem is nearer solution than many suppose. The breeding of pure-blooded cattle, of whatever breed, is carried on principally by large farmers and stockmen, representing liberal capital, who engage in the business in anticipation of large profits and who are really speculators, booming their particular breed with a sound and reverberation that echoes throughout the country. Due appreciation is paid to the several good breeds of cattle now occupying the greatest share of public attention. I do not desire to decry any of them. It would seem that the Shorthorns, the Jerseys, and the Holsteins hold the lead at present. But the great question is, do they fill the bill; is there not something better? I shall attempt to show, before I conclude, that there is. Many persons who have been exposed to certain subtle influences are likely to become what is termed *crazed* upon particular subjects in other words, *cranky*. The farmer may have had his lightning rod up, and been struck with the cattle *craze*—either Jersey, or Shorthorn, or Holstein *craze*—and become so impressed thereby, that no argument could convince him that his particular breed was not the best in the world. In general however, the great majority are open to conviction, and ready to change the scrub for the better, and to press on until the best is obtained. Close observation and careful experiment have done much in the past toward bringing to the front the best breeds of cattle.

The Holstein Craze.—When the Holsteins were first attracting attention, the Board of Regents of the University made purchase of several head of fine bloods, for the purpose of experimentation. It was claimed in their behalf that they were the greatest of milkers, and I remember that my old friend and associate on the Board, the Hon. Hiram Smith, bore this testimony, and mainly through his recommendation the purchase was made; not long subsequently (the Holsteins in the meantime having graduated), the proposition was made in the Board for the purchase of some fine blooded Jerseys, for the same purpose as the Holsteins, and it was strongly advocated by brother Smith, who claimed that the Jersey was the dairy cow, *par excellence*.

Experiment in Cattle.—Not knowing then as much about the milking merits of different breeds as I do now, I expressed surprise at his apparent change of front, and called him to account. His reply was prompt and satisfactory, and to the effect that on the experiment farm we had tried Holsteins, that they did not come up to expectations, and that now we should give the Jerseys a trial, concluding with the statement that an experiment in cattle, or anything else, though a failure, may prove as valuable as if it had resulted in a grand success.

The breed of cattle best adapted to the farmers of the west, those who grow upon their farms a variety of products, is one which combines the two great essentials, milk and beef. I presume there are none to contradict this proposition, as, without argument or elaboration, its truth must be admitted by every intelligent farmer. The benefits and advantages to result from breeding such cattle are too well known and understood to need any evidence here.

Red Polls in the United States.—I make the plea in behalf of the *Red Polled cattle*, and claim that they come nearer to this requirement than any other breed of cattle under heaven. They have been long bred in England, where they originated many years ago; of the same color and general characteristics as at present, and have consequently become one of the most fixed and distinct breeds of that country. The first regular importation to this country was made in the fall of 1873, by G. F. Taber, of Patterson, N. Y., from the herd of Lord Sondes, at Elmham, Norfolk County, England. The fact that the cattle of this importation are still alive and vigorous, although some have traveled from owner to owner, over a large part of the United States, shows plainly that the Red Polls are easily acclimated, have good constitutions, and are long-lived. Since then larger importations have been made, principally by parties residing in the Northwestern states. These importations and their increase of fine, pure, blooded stock, as shown by the American Red Polled Herd Book, now number a little less than 800 in the United States. There is a constantly increasing demand here for these cattle, far beyond the supply, and but for the high prices in England for the best specimens of the breed, larger importations would be made every year. From a personal acquaintance with many, if not a majority, of the gentlemen engaged in importing and breeding these cattle, I am led to say that they strongly impressed me with the idea that, having become convinced that the Red Polls were a great improvement over any of the well known breeds, they engaged in the business to the end that others might reap the benefits of their energy and enterprise, resulting naturally from the introduction and increase of this breed of cattle among the farmers of the West.

Advantages Over Other Breeds.—My advocacy of the Red Polls is based upon a study and observation of the breed during several years past. Their points of vantage may be summarized as follows: They are hornless, and it is better to breed the horns off than to saw them off; they are of a beautiful deep red color, with long, silky coats, and soft, mellow skins; they are as remarkable for their uniformity of shape as of color, being fine boned, smooth, and of good size; they are very docile in disposition, of slow, even temperament, quiet, gentle ways, and consequently easily herded and handled; they are a very hardy and thrifty race, born and matured, as they were, in one of the coldest counties of England; subject to almost perpetual cold, they may be expected to thrive well in a climate like ours, and with their hardiness of constitution, supported by good appetites, they are enabled to thrive on scanty pasturage, which would be likely to starve some of the fancy breeds, that must be cuddled and fed often and tenderly, at all seasons of the year. Senator James, of Richland Center, who has started a herd of these cattle, and who is wintering them now for the first time, informed me a few days ago that he has discovered that they require less food than his Shorthorns, take on fat more easily, and are more rugged and constitutionally are better fitted to withstand the rigors of our climate.

Crossing With Other Breeds.— The Red Polls possess a greater advantage in crossing with other breeds, the grades being very superior animals. Their prepotency is such that when crossed with other breeds, the progeny of this cross will be of solid mahogony red color, and hornless, almost without exception, and so like are half bloods to thoroughbreds in appearance, that it is extremely difficult to distinguish them from thoroughbreds.

This uniformity of color in grades, as in pure bloods, is something to be highly appreciated by all admirers of beautiful cattle. The bran-mash color of the Jerseys, and the ring-streaked and speckled color of the Shorthorns, is odious in comparison with the faultless color of the Red Polls. From the time when, as in Numbers, XIX-2, the children of Israel were commanded to bring for an offering "a red heifer, without spot, wherein is no blemish," no color has been more acceptable to the great majority of the people.

I come now to a more particular consideration of the two great essentials, which I claim these cattle possess in a superior degree—beef and milk. The breeders in England, and later, the breeders in America, who have applied the tests, in the development of this combination of quality found in these animals, are unanimous upon the question, and enthusiastically claim that they are equal if not superior, to any breed in existence.

Their Merits as Beef Animals.— As beef cattle, the Red Polls have ever held a high rank in the London market, and the quality of their flesh, in the estimation of the butchers, is considered as unsurpassed. They mature early and fatten easily. The cow, when not giving milk, will make flesh rapidly, and can soon be converted into a prime beef animal. I remember once discussing the merits of the Jerseys with an enthusiast of that breed, and I made the objection that after their best milking days were over they could not be utilized for beef, as there would hardly be enough left to their little carcasses to make a grease spot. But my friend argued, it was no matter—in view of their superior qualities for the dairy, the beef question could be profitably ignored. The Red Polled cow has this advantage over her Jersey sister: She can be made profitable when age shall have impaired her usefulness for the dairy, by the final results when turned to the use and end of all cattle, which is beef.

The fat steers of this breed are frequent prize winners in England, at the fairs and exhibitions, giving large averages of dead weight, and both live and dead weight comparing favorably with the different breeds bred especially for beef. The claim that this breed furnishes a good beef animal is fully sustained by the record they have made, and seems to be settled beyond dispute by reference to their English history.

Merits as Milk Producers.—Having briefly stated the claims of the Red Polls as good beef animals, I have only to add the general superior merits of the cow as a milk producer, and show that she is well qualified to fill the great and growing demand for the highest superiority in the requirements of a profitable dairy.

The English tests as applied to the Red Polled cow, in reference to her dairy qualities, show that for milk and butter she occupies the front rank among the very best cows. These cattle having been in this country but a few years, and there being not to exceed 800 in the United States at the present time, all told, tests have been made to no considerable extent; but the uniform testimony of all who own, or are familiar with any of these cattle, goes to show conclusively that, for continued milking qualities, from calving time to calving time again, the Red Polled stands unexcelled by any breed; peculiar excellence as milkers appearing to consist rather in the uniform quantity and most excellent quality of milk, than in an exorbitant abundance given for a few weeks after calving, followed by a barrenness of as many months, as is the case in some other of the improved breeds. As winter milkers these cows cannot be surpassed. They have good udders, with good sized teats, the latter point being particularly noticeable in comparison with some of the popular breeds.

Opening for a New Breed.—I forbear to occupy your time with a reference to the particular record, made and published, of the quality and quantity of milk given by the Red Polled cow. In considering the merits of this breed of cattle at this time, and in this manner, my purpose is only to call general attention to the subject; to start our cattle breeders out upon inquiry; to encourage them to investigate the matter in their own behalf; to see if this is not a lead for them to follow, likely to result to their benefit and advantage. It seems to me there is a good opening for a new breed, for the infusion of new blood; many of our old breeds are, in my judgment—to use a slang phrase—played out, and especially I think this is true of the Shorthorns.

They have so long been bred in, and bred out,
 That the breeder is in doubt
Whether the breed that made the track
 Is going out, or coming back.

I have no doubt that the Red Polls are able to furnish the best foundation for a new start in cattle breeds, whether it be to preserve the breed in its purity, or to cross with any other of our numerous breeds.

In the firm belief that persons investing money in the Red Polls at this time will be purchasing an interest in an industry, that although in its infancy, is destined to be most remunerative, I recommend these new favorites to their esteem.

Their beautiful color, their hornlessness, their adaptation to the more rigorous climate of our Western and Northwestern States, their thick, mossy coats, their splendid appetites, their early fattening qualities, their uniformity in size and appearance, their long-continued and uniform milk-giving qualities, and above all, the fact that their progeny, although also the produce of other breeds, is identical in appearance with their thoroughbred Red Polled ancestors I believe, places them in advance of other breeds for the dairy, for the butcher, for the shipper, for the general farmer, and for the breeder of fine cattle.

If the facts I have stated in this hurried manner shall induce any number of our farmers, dairymen, and stock-raisers, to investigate the merits of these new candidates for public favor, to aid in solving the question as to their utility and real value to the American farmer, I shall fell myself well repaid for my efforts in the matter.

MERITS OF GALLOWAY CATTLE.

By J. C. KIRKPATRICK, Iowa County, Wis.

Eighth Paper.

Points of the Breed.—The Galloway is a very hardy breed of hornless beef cattle, of black color, and some of them have a brownish tinge. They have neither horns nor knobs; ears moderate in length, standing well up; eyes large and full; neck rather short with fine throat latch; also the neck fills well into the shoulders; head small with a fringe of long curly hair on top of forehead; body round, long and full; breast very full; back and rump straight; ribs deep and well sprung; quarters long and well filled; hip bones moderately broad; hind quarters drop straight down, carrying their size well down to the hock; legs short and stout with fine bone; tail well set on thick, heavy coat of fine curly hair with under coat of soft, mossy hair or fur.

Docile and Hardy.—They are very docile and sensible, which make them very easy to handle. The Galloways have proved to be a very *hardy* breed of cattle, almost as hardy as the buffalo. The origin of the Galloway is lost in the mist of antiquity; no allegation has ever been made in any well-informed quarter that the Galloway is not an original and distinct breed of cattle.

Vitality and Constitution.—Their beef is quoted as prime Scotts, and has topped the English markets, and sold at an advanced price during the past century. The Galloway is considered the most hardy among the British breeds of cattle, with constitution and vitality second to none. They have 25 per cent. more liver and lung than any other improved breed of cattle. Their vital organs being developed in a higher degree accounts for their superior vitality and endurance. In Colorado they selected a Galloway cow to be kept at the observatory on the summit of Pike's Peak, for military purposes, on account of her mellow hide and long silky coat of thick hair, and wonderful lung power which enabled her to stand the cold and light air of that altitude—in fact there are a great many animals that cannot live at such heights, such as dogs, cats and chickens. When spring arrives the Galloways' long hair is quickly shed, giving place to a fine coat that renders them capable of enduring the extreme heat of summer as well as any of the improved breeds.

Breeding Off Horns.—Their impressiveness of freeing their produce from horns is marvelous, in my experience. I have a Galloway that has sired one hundred and six calves, and not one of them has shown a horn or knob, and all black except two, all being from horned cows of different colored breeds. The Galloway is of good size and is heavier than estimated when cared for properly, and compares favorably with other beef breeds.

Early Maturity and Weights.—As to early maturity and weights, the following showing is taken from the report of the Smithfield, England, Fat Stock Show of 1883: A pure-bred Galloway steer, at two years and nine months, weighed 2,148 lbs.; another two years and seven months old, weighed 1,754 lbs. These are good weights where age is considered. The cows are good milkers, giving good milk, in fact it is of the best quality, rich in butter. The quantity of milk is not so great as that of many milking breeds; there are families that are extra good milkers. The Galloways also raise their calves well.

The Most Profitable.—My father was a farmer and stock-breeder. I was raised on a farm, and now with the experience and observation of fifty long years in raising different breeds of cattle, in Wisconsin, the Galloway has proved to me to be the most profitable.

Adapted for the Range.—In Scotland, where they have been accustomed for centuries to roam over the outlying hills of Galloway, and gather food from the rough grasses that spring up among the rocks and heather, accustomed to be out in all weather, winter and summer, without shelter, only such as the forest afforded them, they have developed a hardy, active habit and a strong, rugged vitality. They are especially adapted for range purposes; for all situations where they have to search for their food, or be exposed to inclement weather.

Beef Qualities.—Their beef is of the best quality, and in the British markets, where it is well known, is eagerly sought after. It is well marbled, the fat laid in thin layers between the muscular tissues, thus furnishing nourishing and palatable meat. The large parts of lean meat are well birdeyed with small specks of fat, making it very juicy and sweet. They also make a large per cent. of lean meat. This rare quality in a beefing breed is most valuable, and one not yet sufficiently appreciated by the stock-raiser.

The Galloways are also valuable for their hides, which are equal to the buffalo's, if not better, for making robes &c., and robes made thus are worth from $15 to $25 apiece when nicely dressed.

A Healty Breed.—The Galloways are a healthy breed, being always free from disease; also hearty feeders, always eating their feed quickly and with a hearty relish. Feed them as well as you will, the day is not too cold for them to roam through the stock-fields, appearing to enjoy the same, and preferring a certain amount of rough feed. They are also very persistent breeders. I have known cows to breed right along up to 20 and 25 years of age.

Beef Packers' Opinion.—In regard to their beefing quality, I will quote the following from Swift & Co., packers, of Cihcago, Ill.:

"This is to certify that our agent, Mr. N. A. Seely, bought and shipped on Dec. 9th 1885, of M. R. Platt, Kansas City, Mo., two Galloway steers. Said steers weighed 4,180 pounds in Kansas City; in Chicago, two days later, 4,150, pounds. Said cattle were killed by us on Dec. 16th and netted as follows: Beef 2,657; dressing 66.40; hide 222; tallow 397, making for the 5 quarters beef, hide and tallow, 3,376 pounds and dressing 81.37 per cent.

"The beef was weighed after being thoroughly cooled. Had it been weighed when dressed would have shrunk about 1 per cent. less. The beef of the two cattle was of very fine quality, and, everything considered, these were the best cattle that we have killed this year, and shrunk the least of any cattle killed by us this year." E. F. SWIFT.

For Swift & Co. Union Stock Yards.
Chicago, Ill., Dec. 20, 1885.

The foregoing speaks for itself, and as it comes from the oldest and largest dressed meat house in America, I think t speaks well for the half-blood Galloway steers. The age of these mentioned steers was 3 years.

In conclusion I would say that I believe that the coming steer of our great cattle industry will be "Polled."

MERITS OF THE GUERNSEYS.

By G. E. GORDON, Koshkonong, Wis.

Ninth Paper.

Purity of Origin.—The best way to get at the merits of the Guernseys will be to look at this breed of cattle from two points of view, that is, to see in what ways they equal well known breeds and in what ways they excel any and all.

Guernseys equal other breeds first in the purity of their origin, second in the agreeableness of their color, third in their admirable shape and fourth in their size.

Their origin on the Island of Guernsey has been clearly defined for about one hundred years. Not only do the laws of the Island forbid the landing of cattle, but these laws have been enforced so thoroughly that the purity of the race is both undoubted and undisputed. When for our own purposes and ends American breeders demanded that the Guernseyman should maintain a herd book; we were met by the unanimous remonstrance that there was no need of a herd book, because all animals on the Island were necessarily pure breed.

Color.—The colors of this breed are agreeable to the eye, and especially to the dairyman's eye; they are most suggestive and indicative of the product. Butter is written large on these cattle. Every point of hide, and hair, and hoof and horn, shines with gold. A herd of Guernseys is a beautiful sight to see, from both the artistic and practical standpoint.

Form and Shape.—In form and shape the Guernseys fitly express the dairy temperament, and the average animal scales high in points. They have level backs to setting on of tail, clean throats, small dewlaps, fine shoulders, broad hips, high pelvic arch, deep bodies, hocks well apart when walking, tails long and thin, fine curved horns, good heads and beautiful faces, large and bright, but gentle eyes, full veins and glands, roomey udders, uniformly large teats, remarkable escutcheons, and are altogether typical and satisfactory.

Good Size.— In size the Guernsey is much larger than the Jersey, approaching the Shorthorn. When crossed upon native cattle they increase the size of the progeny. Used upon any of the large beef breeds the product is a fine animal easily fattened, while, when crossed upon other dairy breeds, greater size and capacity are gained, while the dairy shape is fully maintained and further emphasized. They have been employed by many of the principal dairymen in England and in this country, to grade up the Jerseys, and are very highly recommended to enrich the flow of the Shorthorns, and to give persistence in milking to the Ayrshires. The Guernseys are precocious, very certain and regular in habits incident to maternity, and produce very healthy and thrifty calves that take right hold of life equally well in all temperatures and climates. In these and many other ways the Guernseys equal any dairy breed.

Excel All Others.— The Guernseys excel all other breeds in the following principal ways, viz.: First, in their extreme docility, combined with a highly developed dairy temperment; second, in their hardiness of constitution; third, in providing their own butter color; fourth, in the persistency of their flow, and fifth, in their yield in total solids and in butter fat. They excel in extreme docility, combined with a highly developed dairy temperament. Their gentleness of disposition is so marked as to invariably call forth the surprised admiration from all upon making their first acquaintance. Yearlings and cows regard men, women and children, and even dogs, without distrust or fear, and the bulls of all ages are kind and tractable. These cattle have been so long tended by the women and children of the island as to make them "domestic" in the fullest sense of the term. Nor is this remarkable gentleness produced at the expense of the dairy temperament. Not even the "nervous" Jerseys can show a higher dairy organization. Their industry in feeding, activity in functional qualities, power of rapid digestion and complete assimilation, with a perfect sympathy for everything that relates to the offices of maternity are fully as marked as in their little cousins, the Jerseys. They make a good showing on the rough grasses which are the native food of the Holsteins, yet respond promptly and fully to the more scientific feeding of the modern American dairyman.

Vitality and Constitution.—Again, the Guernseys excel all other breeds in the hardiness of their constitution. They can rough it and "hustle" like a scrub, but to better purpose, having an unimpaired digestion. They can stand cold if necessary, or heat if so circumstanced. Testimony from Guernsey herds in Georgia and the Carolinas, on the Atlantic seaboard, on the Pacific coast, or in the cold Northwest, is unanimously in favor of the hardiness of this race. Some of the most celebrated Guernseys inhabit the bleak, Berkshire hills, and others are coddled in warm farms in temperate climates. But, perhaps, no breed will pay so well for sensible care and judicious painstaking. The breed is free from disease, and especially from tubercular disease, and they seem to thrive upon all soils.

Winter Dairying.— They can be especially recommended to those who keep a winter dairy, as we know of instances in which the returns have been enormous during the colder period of the year. The Guernseys stand alone and singular in their ability to richly color butter at all times of the year. Even in the late winter they make "June" butter. This quality is so unusual and so marked that in new neighborhoods the pure, "uncolored" butter of the Guernsey has been often rejected from dairy exhibitions on accouut of the richness of its color, ignorant judges affirming that such natural coloring was impossible. But those who know the Guernseys are familiar with this yellow pigment which is inherent in the animal, not dependent upon feeds, and which suffuses the skin and shines from every part of the body. A Guernsey bull used in grading conveys this ability to the herd he produces, and one Guernsey cow will color the butter of many natives.

Large Producers.—These cattle are unsurpassed in the persistency of their yield. They are not so much celebrated for their flush as for the steady continuance of the flow of milk. They are very hard to dry off and continue milking to a great age. But most of all, the Guernseys excel in their yield of butter.

The Consular Report of 1887 says: "The cows of Guernsey are celebrated for yielding more butter than even the Jerseys." The Agricultural College at Guelp, Ont., says: "The Guernsey yields thirty per cent. more butter than the average standard of other breeds." Prof. E. T. Gill declares that the Guernseys surpass the Jerseys in richness.

Rich in Solids.—Mr. Tesdale has shown that the Guernsey is richer in solids and in fats in the following proportions, viz.: Being one hundred per cent. richer than the Holsteins, twenty-two per cent. richer than the Shorthorns, and about one per cent. richer than the Jerseys. Five years' test of the British Dairy Farmers' Association gives the following results in favor of the Guernseys:

	Per Cent. Butter Fat.	Total Solids.
Guernseys	4.89	14.09
Jerseys	4.26	13.06
Shorthorns	3.79	12.07
Holsteins	2.97	11.06

Of milk analized in 1880 at the Pennsylvania State Fair, the Guernseys excelled the Jerseys nearly ten per cent. in butter fat, the Ayrshires thirteen per cent., and the Holsteins fifty per cent.

Satisfactory Results.— Very much more might be quoted from many sources, showing the wonderful capacities of these cattle. After many years' experience with three principal breeds, including a representative herd of Jerseys, it is the belief of the writer that the utterance of Mr. Wyatt, of England, will be true if applied to this country also: "No one I have met, who has given it a trial, has ever abandoned the Guernsey for another breed. I have known of long-established herds of Jerseys to be crossed with the Guernsey to increase the size of the progeny and also of the milk yeld, but I never heard of grading Guernseys with a Jersey."

Conclusion.— In conclusion it may be said that great as have been the benefits to American dairymen in the introduction of the higher classes of cattle, yet the advent of the Guernsey will mark an epoch from which very much of the future prosperity of those who are seeking the best material and the best methods will be dated. The only pity is that the Island of Guernsey is a small place and the number of its cattle few.

THE RAISING OF CALVES.

By Prof. J. W. ROBERTSON, Ontario Agricultural College, Guelph.

Tenth Paper.

Bloodand Breed.—"Blood and breed" stand for qualities which are of much service to the stock-raiser. A good steam boiler and engine, adapted by construction to the work to be done, are valuable to the progressive grain thresher. What fuel and oil are to the machinery of the latter, feed and care are to the animals of the farmer. An intelligent thresher with good fuel and skill will get more work out of an inferior boiler and second-rate engine, than a shiftless, careless engineer will get out of the best machinery. I think the same principle applies to every department of farm work, and so I say that the "heredity" and "individualty" of the farmer have more to do with the successful raising of profitable milking cows for his dairy, or steers for his stalls, than the "pedigree" of his herd. As a rule there is no profit in trying to raise late calves, that is, calves dropped as late as May. It pays better from both the dairyman's and stockraiser's standpoints, to have most of the cows begin their milking season between October and February.

Selection of Calves.—In any case the calves from the best milking cows only, should be selected for rearing. The herd bull should have a pedigree linking him to a family distinguished for milking qualities. His points should indicate the possession of powers that do credit to his pedigree. If a calf with a big body at one, two, three or six months old be what is wanted, it had better be allowed to suck its dam. But if a calf having a large profit on its rearing at two years old, and a large profit on its milking, or fattening, be the object sought fòr, then it should be reared another way. Where a calf is allowed to suck the cow, even for a few days, the cow is in a less contented condition of nerve to yield her milk to the hand for some weeks. The restlessness thus caused will tend to the lessening of the milk yield in most cases. The task of teaching the calf to drink is doubly difficult after it has acquired the habit of getting its supper in the natural way. Invariably where a calf has been permitted to run with its mother for ten days, I have found it go back, or at least fail to gain in condition for a fortnight or more, when a change was made to hand feeding. The checking of its growth and thrift at that early stage in its development, entails more loss of possible profit in after years than a partial winter's starvation when eighteen months old. The organs of digestion, whose functions it is to get for the animal all possible good out of its food, for maintenance, growth, beef, milk or work can never be injured with impunity. The treatment from the day of birth should be to preserve, and if possible, to improve the assimilating power.

The First Milkings.—Milk from the first six milkings of the dam should be fed to her calf three times a day. The first milk, "colostrum" or "beastings" is of medicinal as well as food value to the young calf. For two weeks the calf will not need, nor take much besides the two or three quarts of whole milk of each feed. The milk should be fed as near the blood temperature, 98° Fahrenheit, as practicable. After the lapse of a fortnight a gradual change, during the third week, may be made from whole milk to sweet skim milk. Such a change can be best effected by putting skim milk, in gradually increasing quantity, with the whole milk till it is wholly substituted for it.

Sweet Milk.—The skim milk should always be fed *sweet.* The sourness of milk is evidence that some of the feeding value of its sugar of milk (of which it contains say 4½ per cent.) has been lost by the change into lactic acid. Besides the sourness renders the food unsuited to the stomach of a yet tender calf. Sour feed in such a case favors growth in but two ways. The calf so fed will develop marvelous girth extension. "Pot-bellied" is hardly sufficiently expressive of the chronic enlargement from that cause. Then the growth of hair is effectually and speedily promoted. It becomes so strong in "stalk" that it stands out in daily protestations against that kind of food.

Warm Milk.—The skim milk should also be fed *warm;* the blood heat is the best. Where no better convenience exists for the heating of the milk, hot water may be added with advantage. A feed of ice-cold milk, such as comes from the deep setting cans—(by the use of which fine dairy butter can be most economically made)—will leave the calf uncomfortable. That condition is but the evidence that indigestion exists and may easily be made partially permanent by a continuation of such injurious treatment. The power and practice of digesting and appropiating all that is possible out of its feed should be encouraged into a fixed habit, by giving the young animal only easily digested feed in the best condition of preparation.

Regularity.—Attention to strict regularity in the time of feeding and the quantity of milk given is essential to health and safety as well as to profitable increase of weight. These points about the feeding of skim milk will apply to young pigs as well as calves. A gutty, thriftless hog is the necessary product of a careless and wasteful mode of feeding even excellent skim milk.

The Ration.— To make up for the butter taken out of the milk in the shape of cream, some supplementary feed should be given with the skim milk. Linseed, oil-cake, cotton-seed meal, bran, oats and peas are all good. Bran is frequently mixed with chopped oats and peas, and fed raw *in the milk.* That practice is most objectionable, and frequently results in the loss of the full value of the grain fed, besides inflicting injury upon the calf by scouring. The better plan is to put the bran, and chopped oats and peas, with ground linseed in a dry state into a box conveniently placed within the reach of the calf. Between the ages of one and three weeks most calves will begin to eat the mixture. The chewing necessary to comfortable swallowing fits the feed for proper digestion and prevents all risk of scouring from that cause. The chewing also favors the free flow in the mouth of a good deal of saliva needed to thorougly digest the milk gulped down so hurriedly from the feeding pail. Linseed, oil-cake, or cotton-seed meal may be boiled or well scalded and mixed in a syrupy state with the milk. The composition of the additional feed might be about equal parts by bulk of bran, oats and peas. No fixed quantity per head for feeding need be mentioned. It has been found desirable to allow the calves to take as much as they care to eat. Handfuls of the best clover hay—and all hay for fodder should be cut on the green side — may be offered, and most calves will eat with relish at a month old. As soon as grass can be got it should be given in liberal quantities after calves are three months old.

Stabling.— Opinions differ as to the relative advantage of keeping calves in the stable all summer and allowing them the run of a small pasture field. A grass plat with no shade from the sun and where flies are numerous and diligent, is not the best place for calves. But if the calves be kept in a dark, cool stable during the hot days of "fly time," and turned out for the evenings and nights, the protection of the soiling system will be coupled with the benefit of exercise and feed out-side. Some farmers report very satisfactory results, from adding turnips or small potatoes, pulped, to the aforementioned grain mixture, from the time the calves are three weeks old. No matter where fed, in the stable or out, each calf should receive only its own allowance of milk, and that regularly. The distention of the stomach by over-feeding is very harmful. The old-fashioned implements for the feeding of six calves in the field, being but three buckets, or one trough and one big stick, had better be exchanged for more sensible and economical conveniences. Outside feeding from a trough is unsatisfactory, as the big and greedy calves get more than their share, while the weaker ones get barely enough. The construction of small stalls for the calves against a fence in the plat will make it easy to give every calf its own share, in its own pail, in its own stall, thus successfully avoiding the respective risks of gorging and starving.

Satisfactory Results.—Calves reared in this way will gain in size and strength of constitution all spring, summer and autumn. When the severe weather of late fall and winter comes, it finds these calves accustomed to live mainly on grass and dry chop feed, so that the change to stable and winter conditions of existence is not violent nor very trying. The best conditions for profitable growth having been supplied by the intelligence of the owner, the inherited good qualities of any calf will get fair play. But if good qualities of breed inherited from the best of stock be balked at the beginning by unsuitable conditions for growth and thrift, all chance of after profit from milking or fattening is gone. The profits of dairymen can be largely augmented by proper attention to the early feeding of early calves.

EVENING SESSION—MARCH 28.

WHY ADAM LEFT THE FARM.

By Mrs. V. R. C. BARLOW, St. Croix County, Wis.

First Paper.

A Historic Question.—The question is historic, but its classic importance would hardly justify taking up the valuable time of this institute if there were not still living in Wisconsin so many of the Adamses, who, like their illustrious ancestor, are soon to leave the farm, or the farm to leave them. To a multitude of anxious fathers seeking places for promising and unpromising sons, it is a most practical question.

A Question of Dollars and Cents.—It is a question comprehensive of dollars and cents, of blood and bone and sinew, of nerve and brain. It leads to a direct acquaintance with the verbs of knowing, willing and daring, of being, doing and enduring.

A Successful Farmer.—An altogether satisfied and successful farmer, in the year of grace, 1888, is a remarkable creature. He is poet, philosopher, politician, architect, engineer, financier, attorney-general, steam engine, telegraph dispatcher, Job, Solomon, Samson, Argus and General Grant, all rolled into a unit.

Spend a Year on the Farm.—Every boy, to complete his education, ought to spend a year or two on a farm. What will he learn? The supplement of every thing that the schools and colleges teach, common sense included. He will discover the value of time and place. He will become acquainted with material things, with quantities and qualities, the properties of length, breadth and thickness, of strength and weakness, of hard and soft, of heat and cold, of coarse and fine, and not in the abstract either. He will learn to use his eyes and his hands. He will find out something about order and confusion, cleanliness and dirt, impudence and independence, good and bad manners, and what relation they sustain to "getting on in the world."

The Farmer Creates.—"In the division of labors," says Emerson, "it is the part of the farmer gloriously to create." The farmer stands closest to nature. From her raw materials, and often noxious elements, he has provided food and raiment for all the generations of men.

All trade and progress rest on his activity and intelligence.

From the hand of nature, what was old Egypt? — a barren, drifting waste of sand cut in two by a huge stream of black mud, too filthy to drink or to bathe in; fit only for rats and crocodiles. By multiform contrivances and ceaseless industry, the husbandmen of three thousand years ago achieved dominion over it. Reservoirs, canals, ditches innumerable and myriads of water-wheels perpetually pumping converted it into a harbinger of health, cleanliness and fertility. Ever since, in spite of the bad government under the Pharaohs, the Persians, the Ptolemies, the Romans and the Turks, it has been "the land of plenty." Should we ever have heard of Egypt, had the modern theories of free trade been in vogue there? Suppose the leaders of the people and the economists had said to those old freeholders: "Don't attempt to force capital into artificial channels! It will not pay to try to bring under cultivation your sterile fields. It will be cheaper to buy your corn in foreign markets. Your competitors, the Arabs, the Numidians, the Syrians and the Carthagenians, are all eager to sell to you." If one of the patriarchs had raised the question how they should get the wherewithall to buy with, the old fogy would have been told that that was a side issue of no importance—must take care of itself.

Skilled Labor in Holland.— Look at Holland, once a marshy bog, below the level of the sea. What did skilled labor do for her agriculture? The most unpromising soil, by miles of coast fortification and artificial drainage was converted into the fattest meadows of modern times, into pastures teeming with the finest flocks and herds, into the most productive farms, nurses of populous and opulent cities and villages. The seventeenth century saw Holland not only a blossoming garden, but one of the greatest maritime and commercial powers, under the most liberal and enlightened government of the age. The tillers of the land reclaimed from the sea, were the bulwark of the reformation. Agricultural Holland furnished the brawn which upheld England's civil liberty. To the Puritans she gave an asylum until they set sail for America. From farming Holland came the founders of the Empire State. They planted there the thrift, sturdiness and economy which made Holland and placed New York where she is — first in the Union. To-day there is not a citizen in these free United States but is debtor to the so-called unscientific and misdirected industry of the Dutch grangers. Human beings surrounded in youth by conditions similar to those in Eden, where papa stands for the vine affording free lodgings, and mamma for the fig tree providing ready-made clothing, are not apt to develop thinking powers of sufficient vigor to discover much dignity in labor.

An Important Problem.—After the expulsion from Paradise, the first problem that confronted Adam was the same that the gilded youth of to-day are vainly trying to solve—how to get a living and at the same time evade the primeval curse—work. The tradition generally accepted is that Adam chose farming under the delusion—which still prevails—that soul and body may be kept together with less effort in that business than in any other. Herein was Adam's first great mistake. Had he turned his attention to law, he could have gotten into criminal practice at once. Had he became an M. D. and kept clear of poultry shows, there was not one in a thousand leagues to cry quack! Had he gone into politics he could have pulled the wires so as to be elected unanimously to the first office in the realm. But, haunted by rose-tinted memories of the peace and plenty, the beauty and luxuriousness of Eden, doubtless, he idealized all the pursuits of rural life. Its charms he knew, its drawbacks he had yet to learn.

Breaking Wild Land.— It does not take long to find out that there are easier things than breaking wild land. It is work that soils boots and hardens hands. He discovered that garments redolent of the stable had an ill perfume, and that worn plow horses made dull roadsters. Then a brilliant idea occurred to Adam. He would get a hired man! And straightway he hired a nomad that chanced to be tramping that way. But, he turned out ignorant and lazy, more anxious to fill his stomach and get the money for a new blanket suit before cold weather came than to do good work. Thus in his youth did Adam experience the truth of the great American philosopher's proverb: "He who by the plow would thrive must either hold or drive."

Unclean Seed.— It is hard to understand how Adam, having new land, fresh from the hands of the Creator, could have been so careless as to let it get fouled up with all manner of unclean seed. Because, among the flora of that locality, Adam had to contend with burdock and mullein, was that any reason he should naturalize Canada thistles? If, in the settling up of the country, ragweed did spring up by the roadside, was that any reason he should let it go to seed and choke up the fair fields far and near?

Extenuating Circumstances. — However, there are extenuating circumstances to be taken into consideration for Adam's ignorance. He lived at a time when the science of agriculture was in its infancy. He had not even the privilege of gleaning the wheat from the chaff in an agricultural journal. Before a farmers' institute could have shed its beneficent light on the questions that vexed his soul, he would have been an old man — a six-thousand-year-old-man.

Cain and Abel.— Doubtless Adam let his unmentioned sons, those destined for trade and the professions, go to school, but he kept the elder ones, poor little Cain and Abel, at home to do the chores — to milk the cows, tend the calves, fold the sheep, feed the pigs and chickens, water the horses and rub them down, clean the stables, cut the wood and bring it in, hoe the corn and cabbage, weed the carrots and onions, dig the potatoes, and do the thousand and one other odd jobs that parents are wont to delegate to their restless, growing, untrained, fun-loving boys, and then grumble because they are not all well and promptly done. Probably Adam never heard that example is a better teacher than precept. Was it any wonder, then, when the boys saw the old man so eager to get away from work, that they sometimes tried it.

Practical Education Wanted.— Perhaps Adam did not blame his boys when the cows suddenly dried up and the garden stuff got lost in a thicket of weeds, and the horses unaccountably went lame, and the pigs kept him awake o' nights, squealing for supper; but, had he lived in the latter half of the 19th century, I very much fear he would. If our forefathers had only appreciated that all their sons had equal rights to a broad, practical education,—mind and hearts

"Trained for either field or court,
Skilled in every manly art,
Ready, enterprising, smart,"

the farmer boys never would have de-generated into a race of hide-bound men prejudiced, obstinate, narrow, suspicious of new methods, slow to heed instruction, blind to their own interests.

From Bad to Worse.—It is easy to trace how things went from bad to worse on the Adam's farm. After a time Adam had to compete with farmers farther west, where the soil was still in its native fertility, and so cheap that the first crop often paid for the land. His once rich fields sown year after year with grain until they yielded only half a crop, and that shrunken by drouth or chinch-bugs, foul, too, with chess and wild oats. I can see the filthy pig-pens breeding disease. I can see forks and shovels thrown down where ever last used; the barn all out of order, dust sifting down from beams and poles over head, shingles flying in the wind, doors off hinges; the stable floor full of holes; the feed-boxes musty from the sour feed packed in cracks and corners. I can see the bony horses in the rusty harnesses, and hear the creaking old lumber wagon. I can see the poor children unkempt, ignorant, ill-mannered, dirty, snapping and snarling at one another. Was it any wonder that Cain killed Abel? Was it any wonder that Adam wanted to emigrate—to leave that old farm.

Farms That Do Not Pay.—Alas, that farm was the archetype of too many in Wisconsin. They don't pay for the labor hired, the interest on the money invested, the taxes and insurance. Shall the farmer emigrate? A farmer successful in the valley of the Euphrates will succeed anywhere. When unsuccessful there, on account of short-comings in judgment, in integrity, in business capacity, in good management, will for the same reasons, fail in Wisconsin.

Emigrating Farmers.—Those farmers who have been emigrating all their lives—from New England to New York, from New York to Ohio from Ohio to Wisconsin, to Florida, California, Dakota, Washington Territory, and back again to Wisconsin—unsuccessful men everywhere, leading always, hard, up-hill lives—verifying the old saying, "the rolling-stone gathers no moss."

Extravagance, Ignorance.—I have yet to learn of a case where moving has cured the misfortunes arising from extravagence, shiftlessness and ignorance. Grit, good-sense, "get-up and get" are as assential to permanent success in the far west, as elsewhere. He who owns a fair farm in Wisconsin, with her healthful climate, pure water, good markets, good schools, and good citizens, runs a big risk when he breaks up a comfortable home to begin again in a new country for the uncertain chance of making a little more money. Let those, who, like Adam, think of leaving the old farm, because they don't make a "bare living" off it, ask themselves where the trouble lies—in the farms or themselves Are they really farmers? Have they not been, running the farm just as a man, not a machinist, can open and shut the valve of an engine, but helpless if any thing throws it out of gear?

A Hap-hazard System.—The time has come in this country when a hap-hazard, dont-know system of husbandry means *leaving the farm.* The man who knows no more of husbandry than to press all the fertility out of the soil, letting it become more and more worthless every year, deserves to be classed with antediluvian Adam.

Respect Your Calling.—The first thing for men to do is to respect their calling, to believe in it, to honor it. Then, and then only, will it honor them. I am filled with shame and indignation when I hear farmers excusing themselves for being nobodys, shirking responsibilities and neglecting privileges because they are "only farmers." Let them say rather: "Because we are farmers, engaged in a calling so independent and honorable, a business upon which the material, social and political welfare of this nation depends more than upon all others, we owe it to ourselves, to our friends and to our country, to make the utmost possible of ourselves, to make the best of our opportunities, and to fill to the full the place Divine Providence has assigned us."

AGRICULTURAL EDUCATION.

By Prof. W. A. HENRY, Director of Wisconsin Experimental Station.

Second Paper.

Agricultural Colleges.—On December 14, 1857, Mr. Morrill, of Maine, introduced into the House of Representatives, a bill authorizing the establishment of an Agricultural College in each state in the Union, granting for the maintenance thereof, a body of land amounting to twenty thousand acres for each member of Congress the several states had at that time. This bill was reported back unfavorably by the committee on public lands. In 1858-9 the bill passed both houses by small majorities, but was vetoed by President Buchanan. A similar bill was introduced in the Senate by Mr. Wade, May 5, 1862, while Mr. Morrill, the author of the original bill, introduced another similar bill into the House about the same time. The greatest difference between the bill of 1862 and the one vetoed by President Buchanan was that the later bill gives each state thirty thousand acres for each Representative in Congress where the former bill gave only twenty thousand acres, and that the later bill adds military tactics. It is certainly remarkable that when this government was in the throes of a great civil war, Congress should stop and give attention to educational questions as they did. President Buchanan vetoed the bill probably from lack of sympathy with the industrial classes, while Abraham Lincoln, ever mindful of his humble origin and the great wants of the common people, signed the bill July 2, 1862.

Land Grants.—Whoever reads the discussions on these bills as they took place in both Houses of Congress must be deeply impressed with the sentiment ever present, that in this grand donation the needs of the farmer were uppermost. Mr. Morrill in his speech called the attention of Congress to the fact that the profession of war was provided for by the government in its great college of training at West Point. He spoke of the immense grants of land for general education while nothing had been done directly for agriculture. He adverted to the decreasing yield of crops per acre owing to lack of proper knowledge and good judgment in farming. He suggests that these schools could make experiments on the capabilities of soils; the effects of fertilizers and value of different grasses for flesh, milk and fat; the comparative value of roots, grain, and hay for wintering stock; kinds of grain used for stock; deep plowing, drainage, vitality and deterioration of seeds, breeds of cattle and kindred subjects. He spoke of the numerous agricultural schools of Europe and the single one of the same nature already established by Michigan, and believed they "would turn out men for solid use and not droning." No where in these speeches do we find any other thought more common than that they were laying the financial foundations for Agricultural Schools—schools in which young men should be prepared for the profession or calling of farming. Some members opposed the bill on constitutional grounds though admitting that there was need of such education. Said Senator Howe, of Wisconsin, who opposed the bill on constitutional grounds: "The purpose of founding all Agricultural Schools I am as much in favor of as anybody." Senator Harlan said: "This body is a body of lawyers, there are very few gentlemen here who are not professional lawyers. Heretofore, appropriations of land have been made for state universities. The proceeds of the sales of these lands have usually gone to educate the children of professional men who are able to defray the expense of the education of their children away from home in classical studies and learned professions. Here for the first time I believe in the history of the Senate a proposition is made to make an appropriation of lands for the education of the children of the agriculturists of the Nation and it meets with strenuous opposition from a body of lawyers." I say without fear of denial that no one can get at the spirit of the land grant of 1862, as it shines forth in the speeches in Congress, without being deeply impressed with the idea that the movers of the measure were endeavoring to found agricultural colleges in the true sense of that word.

How the Grants Were Used.—The grants were made, but the civil war continuing so engrossed the attention of our people that in most instances it was several years before the States availed themselves of the benefaction. When the legislatures of the different States took the measure in hand, the farming interests as a rule were poorly represented or rather they were indifferent to the matter and no definite plans seemed to have prevailed in their behalf in any of the States. Many of the States gave the money to existing colleges or universities, our own State being one of the number. A few, only, as Michigan, Maine, Iowa and Kansas turned the donation over to bona fide Agricultural Colleges. All of the schools, as soon as educational operations began, made an effort to secure agricultural students. In the several colleges and universities, professors of agriculture were appointed and a course established and advertised, but few students appeared for instructions, excepting in two or three of the schools. Finding their first efforts a failure for the most part the colleges threw the blame for non-attendance, back upon the farmers, and gradually drifted toward general advanced education. That the farmers were indifferent and careless at this time to the state of affairs there can be no denial. If my memory serves me right, forty-five farmers in the Wisconsin Legislature voted to give the land grant to the State University and no opposition of serious weight was raised against the proposition by them. The proof that there was no direct interest taken by them in the matter is shown by the lack of discussion upon the subject in the agricultural press, and the reports of agricultural meetings. Within recent times, however, there has been a general awakening, and a great deal of scolding and fault-finding has been done, and efforts made to bring about a state of affairs which should have existed from the beginning. After a careful study of the matter, it seems to me that the blame rests with both university and college authorities, for not making a more strenuous effort in the direction of agriculture as they were bound to do in accepting the gift, and with the farmers for their indifference in the matter, in the beginning and years after.

Failure of the Land Grant.—But the past is the dead past to us, and only out of the future can come anything of advantage to us, and we must look ahead to see what there is of value for us, as an outgrowth of the grand gift of 1862. That our own university at Madison for years was without agricultural students and did little for agriculture is a fact, but that when the farmers awaked to their needs and demanded recognition from the university they received it, is equally true. Whatever may have been the shortcomings of the Board of Regents of our university I can say with all honesty and sincerity that since my coming to the department of agriculture they have shown an earnest and eager desire to foster and enlarge its activity in all directions, that gave promise of good to our people. I fully believe that the great failure of the land grant of 1862, to accomplish the good prophesied for it by members of Congress in their speeches, came from a total inability of our people to make use of a gift prematurely given and received before the grantees knew how to properly handle it. If the University of Wisconsin failed to properly use the agriculture and land grant fund, I believe it was not because of hostility by them, but a lack of knowledge of how to use the money and an indifference of our farmers in helping them in the matter.

The Short Course.—But again to the future. Three years ago it was concluded by the Regents that a short course in agriculture should be offered to our farmers' sons in the hope that if they would not pursue what was styled our long course in agriculture they would come to us for at least a winter. In this short course we were directed by the Regents to introduce what I may style the intensely practical side of agriculture and to leave out theories and general training except where necessary to proper instruction. While other States had offered a winter course of this kind, which generally proved failures, Wisconsin took the lead in spending money freely upon the course and making all of the teaching in this course applicable to it in all its arrangements and details. In the other Colleges, students who came for a short time only were compelled to fit themselves into classes already established and to listen to lectures given to general students; with us the instruction was to be for the class and it only. In this, which may be called the new method of teaching agriculture, Wisconsin took the lead and has set an example that some other States are already endeavoring to follow. The first winter we had nineteen students in this short course; in the second, twenty-six; and the third (the present) twenty-five. Nearly all of our students were farmers' sons who left the farm to come to the University and who left the University at the close of the course to return to the farm. As I address you this evening, there sits scattered among you eighteen of these young men who have remained over from the short course class since last Friday when the term closed until this time for the purpose of attending this Farmers' Institute. These young men are farmers, heart and soul, and I assure you it has been a pleasure for us to give them instruction, and if I may judge from expressions uttered by them, they in turn are delighted with what they have received. The instruction they have received has been as follows: A daily lecture, or talk I should call it rather, by Dr. Babcock upon chemistry relating to agriculture, daily instruction by Prof. Barnes in "how plants are built up, live and grow," a daily lecture by myself upon stock feeding, breeding, drainage, &c. while twice a week Dr. Atkinson, the State Veterinarian, has been with us teaching the structure of the horse and other domestic animals, and the best methods of preventing disease and curing it. That this course has cost the University a considerable sum of money I need not tell you. The Auzoux model of a horse which Dr. Atkinson will show you in this room during the institute alone cost us over $800, which will give, you an idea of how the expenses count up. Let me say that not once have I heard the expenses of the course questioned by the Regents; the first question is not "what will it cost?" but "can we get more students, thereby."

Mechanical Training.—I have failed to mention the mechanical training so skilfully given by Prof. King, of the University machine shop. Every boy that came to take the course thought he knew how to saw a board in two, and his chagrin was great when he found himself unable to do so simple a thing properly. How they have advanced in wood turning, iron work and wood work is shown in a small measure by the samples of their handiwork on exhibition in an adjoining room. You will see that our farmer boys can do pretty good blacksmithing, and can make joints, do planing, sawing and turning in a way that would make an ordinary boy green with envy. I urge upon our farmers present to give us their cordial encouragement at this time; we want your boys at the university to take either the long or short term in agriculture, and are prepared to give them better instructions in the future than in the past. Next year our corps of teachers will be enlarged, our building improved and our facilties amplified. Send us the young men and we will help them more than you suppose we possibly can. I say this with confidence, for three classes have now gone out who have had such instruction as we can afford, and I know that our work will be far better in the future than in the past. Do not find fault with us for not having students when we are spending money freely to provide instruction. A merchant cannot sell goods no matter how loaded his shelves may be, if customers will not come to purchase.

Short Course Students Respected.—One more point and I am through. I have asked the young men as they were leaving us, if they had been mistreated by other University students because they were pursuing agricultural studies, and can learn of no wrong acts from others in the University for this reason. One farmer told me he was afraid to send his boy to Madison, because the other students would make fun of him. I told him in reply that in no other place would his boy be freer from the jeers and taunts of others than in our State University, if he carefully attended to his own affairs. We have the most complete democracy on earth, and only dudes and "smart" young men who "talk too much" need fear being molested. If your boy comes to the University with the expectation of surprising fifty professors and six hundred students there assembled, by his wonderful erudition and extensive knowledge, I do not care whether he matriculates as a law student, a pharmacy student, a civil engineer, ancient classical or agricultural, he will soon find himself in trouble, not because of the course he belongs to, but because he is entirely too smart to live with, and must be put down.

The young men that have come to us have, with very few exceptions, been in dead earnest about their business, and have attended to their work faithfully, and have commanded the respect of teachers and fellow pupils. Our University affords excellent opportunities for a farmer's boy; here he meets with all classes of young men having all sorts of ideas and ambitions, and is greatly benefited by such contact, for his ideas are broadened and the clannish spirit melted out of him.

Success of the Short Course.—When our short course was started, I was very doubtful of its success; now I have a firm belief that we are on the road to better things than the sanguine ones thought possible, we must not take a backward step, but go forward; send us the boys and we will lengthen and strengthen the course, spending money and energy gladly and freely; again, I say, send us the young men, and my word for it, neither you nor they will regret it.

Now, I say that our agricultural course is a success. I believe, within three or four years, it will be a grand success to the young farmers of the State, if the farmers will do their duty. I want you to help us advertise this course. We want everybody to know of it and be talking about it. If you will do that, call the attention of the young men in your neighborhood to it, we will get them into the University, and when we get them there I will guarantee we will take care of them.

Discussion.

MR. BENTON — What does this short course cost aside from board?

PROF. HENRY—The boy will buy about $12 worth of books on agriculture and familiar science, which he takes home with him; he will pay the University $4 for incidental fees, that makes $16, and that is all the expense I can name aside from his board and incidental expenses. His board will cost him about $2.50 a week, if he boards at the club, and his room will cost him $1.00 or $1.25. Seventy-five dollars will cover the expenses of a reasonably prudent young man for the twelve weeks, from the time he steps off the cars in Madison until he takes the cars to go home.

MR. URQUHART — I have heard about this short course that has been talked about in the State, and must confess that I did not have much faith in it, but seeing is believing, and what I have seen to-day has convinced me that it is useful and extremely practical. I see some work in that room where the exhibit of mechanical student work is, that would make some of our mechanics who call themselves mechanics, blush to see, and they tell me it was all done by these students. There seems to be a great objection among farmers' boys when they leave the farm to going back again, but these agricultural colleges seem to correct that feeling. In Ontario, where they make a business of sending children to the agricultural college, they find that over 85 per cent. of them go back to the farm again.

FARM RESIDUES.

By Prof. MANLY MILES, Lansing, Mich.

Third Paper,

An Age of Progress.—This is an age of industrial progress. The invention, of machinery, improvements in the steam engine, and systematic organization, with large accumulations of capital, have revolutionized our means of production and transportation, and brought the most remote regions of the globe into the most intimate relations of common interest.

This progress, in the logic of events, has led to a complete reorganization of methods of production in manufactures of all kinds, and the most intense competition has reduced the margin of profits to a point that is fatal to all establishments that are not on a sufficient scale to make the sum of small items of profit an aggregate worth seeking.

Let us briefly consider some of the conditions under which the world's work is performed in the industrial arts. Large investments of capital are needed, and specialization and intensity in production must be supplemented by an intelligent subdivision of labor with strict economy in its applications. An unskilled workman with a machine takes the place of the skilled handicraftsman, and the rapid exchange of commodities is an essential condition of success.

Even with these aids to cheap production, manufactures in many cases have only succeeded by utilizing residues which had before been wasted. The applications of science widened the available resources of production, and the residues in many instances became the dominant interest of the industry on the score of profit.

Low Prices.—Agriculture is fortunately exempt from many of the conditions that diminish the margin of profits in other industries. Facilities in transportation which bring in competition the products of cheap and fertile soils, and cheap labor, are the leading factors in determining the low prices of farm products which now prevail.

This competition cannot be evaded, and the farmer has no reasonable hope that former high prices will again be realized. It must be met by an application of the same general business principles which command success in other industries.

From the very nature of the conditions involved, specialization, and intensive systems of production, and the subdivision of labor which are essential to success in other arts, cannot be applied in farming. The intimate relations of the different interests of the farm are not recognized in special farming, and high farming cannot be looked upon as a remedy for prevailing low prices. Under an intensive system of farming, every increase in the product, beyond a certain limit which varies with each farm, involves an increased cost of production.

The only remedy for the prevailing low prices of the farm products, that can be safely recommended, is the practice of a thorough and consistent system of farm management which provides for making the most of every resource, and this involves an economical administration in the expenditure of labor and the utilization of all farm residues, so that all wastes may be avoided.

Hand and Brain.—Every aid that science can render must be brought to bear on the problems presented in every department of the farm. The relations of chemistry to agriculture are so well understood that they need only be referred to here.

In physics the law of the conservation of energy has revolutionized its methods of investigation, and as the farmer is constantly dealing with energy in its various forms and modes of action, he, too, is interested in the applications of this general law of nature.

The comparatively new science of biology has to do with life in its various manifestations under a wide range of conditions. As the farmer is constantly dealing with living organisms, from the crops which he grows, with the world of vital forms which influence them for good or ill, to the animals which he cares for, with the numberless parasites which assail them, he must be interested in the laws of vital activities which supersede or modify the ordinary physical and chemical forces with which he is familiar.

Every department of science has, in fact, relations more or less direct, to every subdivision or interest of the ordinary routine of farm practice. It may safely be asserted that there is no business or profession in which so wide a range of knowledge may be profitably made use of as in farming.

Science and Agriculture. — The relations of science to agriculture must not, however, be overrated or misconstrued. Agriculture is the oldest art, and its practical principles have been well established by long experience. Science cannot be reasonably expected to essentially modify or supersede them. Its mission is to explain the results of practice and suggest new lines of experimental investigation that will add to the value of our experience, and lead to improved methods of management, with greater uniformity and certainty in the results obtained.

Barnyard Manure. — Among the residues of the farm, barnyard manure may first claim our attention from its paramount importance in a system of mixed husbandry.

In discussing the subject of manures to a popular audience it will be best, on the start, to make a concise statement of some of the leading facts in the nutrition of plants and animals, and their correlated relations.

Of the 70 or more elements known to chemistry, only 13 enter into the composition of plants and animals. Four of these, viz., carbon, oxygen, hydrogen, and nitrogen, with a little sulphur, form protoplasm, "the physical basis of life," and an essential constituent of every living cell, and they are also of particular interest as making up a large proportion of the dry substance of plants and animals. From 8 to 31 per cent. of plants, and from 35 to 65 per cent. of animals, may be reckoned as dry substance, the rest being water. Of this dry substance, nearly one-half is carbon, and next to this in amount is oxygen, with a small percentage of hydrogen, and from 2½ to 3 per cent. of nitrogen.

When the plant or animal is burned, from 1½ to 7 per cent. of the dry substance remains as ash. Eight of the original 13 elements are found in the ash, and among them are potash and phosphoric acid.

The natural supplies of ten of the thirteen elements which enter into the composition of plants are abundant under all ordinary conditions, but the other three, nitrogen, potash and phosphoric acid, are often deficient in the soil, and they need, therefore, to be supplied in the form of manure. Most of our farm crops supply all of the elements required by animals, and there is seldom need of a special provision of any particular element when food is provided in proper variety and quantity. When farm crops or purchased foods are consumed by animals, the nitrogen, potash and phosphoric acid which they contain, that are not needed for the purposes of the animal economy, are voided in the manure.

The Value of Fertilizers.—The value of barn-yard manure will depend, in the first place, upon the amount of nitrogen, potash and phosphoric acid in the feed consumed, and in the second place, upon the conditions under which the manure is kept and applied to the soil.

On the average, animals will retain for the purposes of the system not more than ten per cent. of the nitrogen of the consumed food, and but from 1½ to 2 per cent. of the potash and phosphoric acid. Pigs will retain of these constituents rather more than sheep, and sheep will retain slightly more than cattle.

With store stock, making no gain, the manure will contain all of the valuable constituents of the feed. Cows giving milk and young growing stock will appropriate more of the nitrogen, potash and phosphoric acid, than fattening animals, and their manure will accordingly be less valuable with the same feed.

The following table of the value of the manure produced from different articles of feed, when consumed by average farm stock, has been made from the latest data furnished by the American analysis. The values are based on the cost of the nitrogen, potash and phosphoric acid in the form of commercial fertilizers.

Value of manure produced from one ton of feed by average farm stock:

KIND OF FEED.	Value of manure from 1 ton of feed.	KIND OF FEED.	Value of manure from 1 ton of feed.
Corn	$6 20	Timothy hay...	$6 25
Corn stalks......	4 10	Potatoes........	1 68
Oats	6 62	Carrots..........	87
Oat straw	3 00	Swedes..........	1 10
Wheat...........	7 24	Mangles	1 43
Wheat straw....	2 26	Corn meal......	5 33
Rye	6 70	Middlings	8 90
Rye straw.......	2 60	Shorts	10 64
Barley	7 49	White bean.....	12 50
Barley straw .	2 75	Brewers' grain—	
Peas.............	13 50	Fresh	3 60
Pea straw	5 00	Kiln dried...	12 80
Beans............	15 00	Malt sprouts....	16 50
Bean straw......	6 00	Linseed meal—	
Buckwheat......	6 88	Old process..	20 00
Buckwh't straw.	4 94	New process.	22 00
Fodder corn (green)........	1 10	Cotton seed meal	28 50
Clover hay	9 50		

The actual values will, of course, vary somewhat with locality, but the relative values will remain essentially as represented.

Barnyard manure is the residual producer of the farm, resulting from the the manufacture of feed into animal products of greater value. This residue is too generally neglected, and statistics indicate that the losses involved in careless methods of management must be enormous.

Value of Manure.—From the latest estimates of crop returns for the year 1884, the value of the manure produced in the United States, or what should be utilized as such under a consistent system of management, cannot be less than $1,269,000,000.00, which is more than twice the value of the total agricultural exports for the same year. It is undoubtedly safe to assume that at least one-half of this valuable residue is lost from neglect, or ignorance, of the best methods of preserving it. From this it must be seen that if this residue was all utilized the agricultural exports of the country might be doubled without making any additional draft on the elements of soil fertility. In the State of Wisconsin we cannot estimate the value of the barnyard manure for the year 1884 at less than $35,000,000.00, and the losses involved under present conditions of farm practice must, in the aggregate, be at least $15,000,000.00. An annual preventable loss to the farmers of the State of such magnitude should receive thoughtful attention, and a wider diffusion of knowledge relating to the sources of such wastes must be recognized as of the greatest practical importance.

Conserving Fertility. — The best methods of conserving the elements of fertility in the form of barnyard manure may be readily understood and the consistent and systematic application of a few simple principles will serve as a safe guide in practice.

From the limits assigned to this paper in the bulletin, a concise outline of these principles can only be presented, without any detailed discussion of the subject.

Growth of Crops.—Although other constituents may have a more or less direct influence on the growth of crops, we may confine our attention to the nitrogen, potash, and phosphoric acid contained in barnyard manure, as the elements of dormant interest, from the fact that the natural supplies of other constituents, under ordinary conditions, seem to be ample for the purposes of plant growth.

In fresh barnyard manure the nitrogen is mostly in organic combination, and not in a soluble form; there is but little ammonia in the form of salts, and the mere traces of volatile ammonia are practically not worth considering.

Potash and phosphoric acid are in the main in insoluble combinations.

In the almost entire absence of volatile constituents, of manurial value, the only waste of fresh dung of practical interest will be from leaching of its small proportion of soluble constituents.

Microbes.—In fermenting barnyard manure a variety of changes take place, the sum of the effects being to increase the solubility of the elements of fertility. The fermentation of manures is caused by minute living organisms called microbes, each species producing a particular kind of fermentation. In the putrefactive fermentation organic nitrogen is changed to the form of ammonia, and the volatile ammonia that may be produced in the interior of the heap becomes fixed by organic acids and changed to the soluble form, and there is little or no escape of volatile ammonia.

The offensive odors escaping from manures in the form of gases are mostly of no value as fertilizers, and the sense of smell is not therefore a reliable test of manurial values. Another microbe, or perhaps a number of forms, changes ammonia, and likewise organic nitrogen, to nitric acid. The potash and phosphoric acid are likewise made more soluble in the processes of fermentation.

From the increased solubility of the valuable manurial constituents in the process of fermentation the dangers of loss from leaching are intensified, without any escape of valuable materials in the volatile form, of any practical importance.

When and How Applied.—In farm practice the bulk of the manure should be applied to the soil before fermentation takes place. Fermentation of manure in contact with the soil aids in its disintegration, and by this indirect action liberates plant food that would not otherwise be readily made available.

From the facts which have already been presented it will be seen that absorbents of volatile matters are not important factors in the preservation of manures. They may be employed to deodorize the air of stables, but to prevent the escape of fertilizing materials in the form of gases, they may do harm by diverting attention from the real sources of waste. The specific action of the absorbents in popular use were discussed in detail, and the fallacy of their assumed influence was pointed out.

How Kept.—When manure is kept in flat, compact masses through which water is not allowed to leach, to wash out the soluble constituents, fermentation will be retarded or entirely prevented, the valuable fertilizing materials will be retained, and there will be no waste of nitrogen in the volatile form.

With high piles the liquids containing the soluble constituents leach downwards, the upper part of the pile is deprived of a part of its fertilizing constituents, and unless extraordinary care is taken the liquids are finally wasted.

Manure kept under cover, and protected from rainfall, may be preserved without loss with a moderate amount of litter to absorb and hold the natural liquids. Manure cellars are not necessary, and under ordinary conditions of practice it is better to dispense with them entirely. Manure may be preserved in open yards with a minimum of loss if sufficient care is taken to prevent the leaching and escape of liquids. The yard should have a water tight and slightly concave bottom, the manure leveled down with an abundance of litter to make a flat, compact mass as the animals tread it down—water from the eaves must be carried off in suitable gutters, and no liquid must be allowed to run from the yard. The rainfall will do no harm if there is litter enough to absorb it and keep the yard comfortable for cattle, and it is not allowed to soak through the manure and wash the soluble constituents away. Evaporation from the surface will often equal or exceed the rainfall in amount, so that provisions for retaining all of the rain that falls during the year is not needed.

How Spread. — The dangers of waste will be diminished by applying the manure to the soil under proper conditions as soon as it conveniently can be after it is made.

Manure taken to the field should always be spread at once over the surface. It should not, under any conditions, be distributed in small piles to be spread afterwards. Manures should be kept near the surface as there may be loss from leaching to the subsoil if not immediately appropriated by growing plants. If manures are plowed under, a shallow furrow slice will be best, as the microbes of nitrification act more efficiently in the preparation of plant food near the surface.

How to Prevent Waste.—The conditions required for preventing a waste of manures may be briefly stated as follows:

1. Water tight floors and manure gutters, with sufficient litter to absorb all liquids.

2. Keep in flat, compact piles, protected from an excess of water, and provisions for preventing all waste from leaching.

3. Apply to the soil as soon as convenient, and spread immediately on the surface.

ADVICE AND BREED.

By R. G. HORR, Michigan.

Fourth Paper.

An American Peculiarity.— Some cynical person has said that American people are peculiarly noted for one characteristic; he says that as a rule they talk best on the things they know the least about. That being the case, I am in excellent condition to talk to a farmers' institute, and I think there is some truth in the saying, for I think I have noticed in my entire life, that people do usually talk the best in this country about things they know the least about. If a man is sick, he can always get a prescription from every man and woman he meets right on the street; they will always tell him just the thing that is needed to cure him, that is everybody but the doctors. They will give you their pills because it is their business, you know, but if you could see the doubt in their own minds as to whether they were going to kill or cure you, you wouldn't take their medicine. You remember we fellows who staid home during the war. You let us get down town in some office and couldn't we put down rebellion in good shape, while the people at the front were generally a little doubtful how the thing was coming out.

Gratuitious Advice.—Every farmer here knows as a rule you can get advice how to run your farm better and easier from the man who never plowed a furrow in his life or hoed a cabbage, than anybody else. I don't mean any reflection on you, Brother Keyes. I used to, when young, teach school and board around, and do you know, I could always get advice as to how to run my school from every patron in the district. Any preacher will tell you that he can always get advice how to preach a sermon, just what to say, when to say it, and how to say it. He will always get it the most readily from the fellows, who, to save their souls, can't tell the difference between orthodox and burdocks. After this explanation, you won't think it preposterous in me if I talk about cattle, will you? Of course, I need not tell you that I have one big advantage in talking about cattle, and that is, that I was raised myself upon a farm, and, by the way, did you ever see a man that wasn't raised on a farm? I'd go a good ways to strike a man of that kind.

Breeds of Cattle.— I am interested somewhat in the discussion that I have heard since I came in here on this question of breeds of cattle, from the fact that where I lived in our State, it is a subject of very great interest, and I was surprised to find my friend, Keyes, reading an essay to prove that the best cattle that there were in the entire world was a breed that I never heard of in my life. Most of these pictures hanging around this room, are familiar to me. Where are your Red Polled?

Now, there isn't anything that interests farmers in the cattle line more than the question of how you can get an animal that it will pay you to keep. That is the only test of which cattle are good for anything; it is the kind that pans out well in the end. Do you know I have a sort of an old fogy idea that we have been struggling and fussing over this question in this country for thirty years a good deal, and you know the subject I am talking on is something I don't know much about, but I don't think for beef, we have ever beat the Shorthorn yet. I think we can improve our cattle by mixing them with any good breed.

Holsteins for Milk.—Now, have you ever noticed cows in pictures? Are they always just as they are in the barn? They vary in the barn; they never do in pictures, and isn't it true it doesn't make so much difference what breed of cattle you have? The best cows in every breed are pretty good ones, and the poorest cows in every breed are almighty mean, that is the fact about it. I have an idea that the best milkers today in the world are the Holsteins. I say that because I am better acquainted with them than any other of the modern animals in this country. Yes, I think they give more milk, but I don't think it is fair to test them by the rules that they adopt in showing these wonderful weights of milk. You take a big Holstein cow, and in order to get the record that they get, you have to keep two men feeding her, and one milking her, and if you keep that right up vigorously year in and year out, you will get considerable milk. I have an idea that for cheese making purposes, and for skim milk purposes, the Holstein is the best animal. For coffee, give me the Jersey, but I don't want her for anything except coffee. As a rule my observation is, the Jersey is too small. As a rule, she doesn't give milk enough for a good sized family, but as I stated a little while ago, you can get a pretty good cow if you get the best in any breed, and there is nothing that this country ought to examine more than to find out a breed that will combine the two things, as our friends said, beef and milk. I don't know, I doubt whether you can combine both those qualities, even in your Red Polled. I doubt it. I think as a rule an animal that is the best for milk is not very well adapted for beef; at least my experience is, that where an animal runs to beef she is a poor milker, and that a good cow never puts on flesh much while she is milking, and consequently I have an idea, that the great question of raising cattle should be divided into two classes. If you are going to make dairying your business, and it is a very good business in these days, breed your cattle for milking, and if you are going to feed steers, and run to beef, I would run to beef and let the milking business go. Some people may raise both. There may be animals in the world that are fitted for both, but I have never discovered them. I know they tell me the Holsteins are wonderful beef cattle. I never saw any of them that were.

Herefords and Durhams.— Where we live we run to Herefords. There are some very valuable ones near where I live and they are very fine for beef purposes, that is, those they take to the fair. I don't know how they do on an ordinary farm. The animal that pays best is the one that we men who don't run to fancy cattle are going to keep. The cattle we want are those that are hardy, those that look durable, even if you don't feed them all the time or curry them every morning. I don't know just exactly, nor do I think anybody knows, just what breed of cattle we should raise. In the country where I was raised, an old English gentleman brought with him from England some old Roan Durhams, and from that day to this, you go into that neighborhood and the steers in that neighborhood will average three or four hundred pounds more than they will average in any other place in that section of the country; that man did the farmers of that community more good than they could ever comprehend, even after he has been dead and gone thirty years, and yet the improvement in stock that he introduced into that township is living right on to-day; that is the reason that I am prejudiced in favor of the Shorthorns.

At our State Agricultural Society, a few weeks ago, were some cattle they called Red Durham, but they don't look at all like those I am talking about. They lacked size, they lacked what I called the beef qualities, they were very sleek looking animals, but I have an idea that for the farmer, what you want of a steer is one that will weigh. At least, that has been my experience. When I had one to sell, if he didn't weigh anything, I didn't get much for him. Consequently, I am in favor of those old fashioned Roan Durhams for beef, that you could make without constantly feeding them. Now, if somebody could only invent or produce an animal that would get along without eating, that would be the stock to introduce; but as a rule you have to feed your animal everything that the animal makes into meat, and I say, as a rule, the old fashioned Roan Durham would appropriate more feed and come out with more meat than any animal I ever met in the United States.

The Great Industry.—Now, my friends, there are people here who want to talk on something they know about, and consequently I must just simply thank you for this kind greeting. I am very glad to have been here and I am going to stay and see what you people have to say, because we are all interested in the advancement of the great industry which lies at the bottom of all the industries of the United States. Without the products of the soil, our country would beof no use in the world. I believe in just such associations as this, and all I hope is that, as a rule, you will have people talk to you about things that they have investigated. What I have said was simply because they got hold of me and forced me to say something. I am very thankful to meet so many of the farmers of Wisconsin, and I hope hereafter some time, we may all meet again.

THE FARMER'S DUTY TO HIS SCHOOL.

By C. W. GARFIELD, Lansing, Michigan.

Fifth Paper.

Our Rural Schools—Are the fountains of agricultural progress in our country. Our future farmers and farmers' wives are largely moulded for their life-work within their precincts, and we should let nothing stand in the way of their highest development in method and results. We can afford to take time in a farmers' institute to discuss their weaknesses and lay plans for their betterment.

No Children to Send.—There is no

excuse in the fact that many of us have no children to send. The effect of poor tuition is felt by all, and I have no sympathy with people who raise a family of children and send them to school, simply to get them out of the way, with no farther thought concerning their environments when away from the parental eye. This carelessness with regard to the education of children through their associations, is a fault which threads into every rural district.

Radical Errors.—The following I name as the most radical errors that crop out prominently in our system of schools:

1. It is desirable to secure the maximum length of term of school most for the minimum amount of money.
2. The number of days in the school room multiplied by the number of hours per day determines the value of the school.
3. Money used in embellishing school premises is wasted.
4. Children attending a rural school are quite safe in their moral development.
5. It is natural for little girls to be neat in their appearance and manners; but boys are of a rougher type and must have "full swing," and no matter how they are attired.
6. As soon as children can walk to school, they should go, so as to be out of the way, because they are only a nuisance at home; and it is the teacher's business to care for them and instruct them.

Importance of Good Teachers.—To the good farmer I would put the matter in this way: A well-bred animal can not be trusted to a poor hired man. You seek the most trusty and skilled help to care for your high-bred stock, and then you look personally after their development. You can not afford to do less by your children. The matter of compensation to the hired man or woman to whom you consign them at school is of little importance, provided you get the right help. The herdsman who simply feeds, waters and cards, is unfit for his place. He must study the individuality of the animals and suit his attention to their needs. The teacher must have the "herd" of children close to his heart, and if properly equipped for his work in mind and sympathies, the work is not simply six hours per day, but all of his waking hours. The farmer should demand this for his children and pay for it commensurately.

What Tuition Consists In.—Tuition is not simply assignment of lessons and listening to recitations. Thousands of things in the outside world can be made to contribute to the moulding power in the school-room, and every parent should appreciate the instruction that may be given in the fields and woods and by the roadside. If you are fortunate to secure a teacher who can grasp this work, do not for your children's sakes repress the efforts by accounting the hours which the teachers spend with pupils out-of-doors, giving them glimpses into the great world about them, as lost in settling up the wages for the term.

A Discouraging Feature.—One of the most discouraging features of our common school training is, that the accompaniments of the instruction given are in such discordance with the best things to be taught. Children are expected to be neat, orderly, methodical etc.; in truth to grow in those attributes of character which will, later, aid them in getting a comfortable living and enjoying to the fullest extent the income of thrifty habits. They are to acquire these attributes of character in a schoolhouse that has less care than an ordinary horse-stable; upon grounds that are not cared for as well as the average meadow; at a place where no respect for public property is expected; in truth, the most general excuse for want of attention to school premises is that the children will so soon destroy their comeliness.

Why Boys Are Destructive.— Is it a wonder that boys throw stones through the windows of empty houses when their parents expect they will, without compunction, pull a clap-board from the school-house at will? Is there so much to blame in a child who breaks a twig from a valuable ornamental shrub, when his father's excuse for not planting shrubbery about the school premises, is that the boys will destroy every green twig anyway, and there is no use in planting anything?

Respect the Rights of Others.— There is no surer way to teach children respect for the rights of others than to practice it upon the school grounds. There is no surer way of inculcating principles of correct taste than under the guidance of the teacher, in making delicately beautiful every nook and corner about the school-house and grounds. There is surely nothing that can be taught the average girl and boy from the farm that will ultimately give them more pleasure than facts concerning trees, plants, insects and animals about them; and there is no discipline superior to learning to record accurate and honest observation.

The School House—Should be kept sacred to school purposes; should be maintained as a model of neatness. Not an obscene mark should be allowed to remain on it for a day. The closets should be kept tidy and in a perfect state of repair, and the girls' closet should be so arranged by planting of shrubbery as to have a somewhat secluded walk to it. Parents and officers cannot demand less of a teacher, than that his association at the children's games and about the premises, shall be so intimate that he shall know about the tendencies, if there be any, toward corruption of morals.

The seeds of the worst forms of immorality are sown at our schools, and for their rapid development our parents are directly responsible, owing to their utter neglect of matters at school.

Country Boys—Are too often country boors, and grow up to be utterly careless of manners, of dress and address, because courtesy and tidiness of apparel are not expected of them. Many a gentlemannered woman is worried daily over the coarse, thoughtless husband, simply because as a school-boy he was not given proper tuition in the amenities of life which were dubbed by his elders as "city fangles."

The Farmer's Duty—To his school, farther demands that he should think enough of his children to keep them at home, and teach them the "ins and outs" of the farm, until they are of a suitable school age. There are worlds of things for the little ones to learn about the farm premises, while their little bones are hardening, and it is brutal to compel them to set upon hard benches several hours a day. Parents should give attention to these early years of tuition, and not delegate it to a stranger.

The Mother's Duty.—But mothers often say to me: "I have no time for this work, and the little ones, and must send them to the teacher, who is employed for the work." Without farther argument I must answer firmly and feelingly: "Then you ought not to be a mother." Home, childhood and parentage lose all their charms when parents can not spend time to guide the germinating minds, for whose existence they are responsible.

Your Duty—To your teacher does not rank among the lesser duties. Once given an instructor suited to the work, he should secure your keenest sympathy, and most earnest support. Only in this way can the tuition secure its best fruition. New methods should be secured kindly; and all their social accompaniments, which combine entertainments with instruction, that are instituted in connection with the school life, should be warmly supported; and to ensure the highest benefits therefrom the spirit and enthusiasm of the juniors should pervade the homes of the school patrons. Singing, writing, reading, and spelling schools, lyceums and debating clubs, organized by earnest, original and enthuastic teachers, should interest every parent as well as child.

Our Teachers.—But a small proportion of those who attend rural schools ever have opportunities of academic and collegate courses. But if our common schools are made what they may be, the leaders of the next generation will largely be those, whose only certificate of graduation will be for attendance at the country schools. Let us not forget our duty, but begin now to take an abiding interest in the education of our children and use every means in our power to arrange for the best tuition, with pleasant and sympathetic environments; and show our interest in the growing ones by our presence and encouragement.

* * *

THE APIARY.

By Mrs. HILLS, Sheboygan County, Wis.

Sixth Paper.

A Woman's Experience.—A recent writer on the subject of bee-keeping has remarked, that to conduct an apiary, *successfully*, requires more study, experience and skill, than to guide a steamship across the Atlantic ocean. In view of such a statement as this, it would seem preposterous for a novice with only four years' experience, and a woman at that, to attempt to give much information in regard to this industry. But considering the numerous letters received from women, earnestly asking as to the possibility of thus obtaining bread or themselves and their children, an acount of one woman's experience in the work, may not be out of place; and as tside the ranks of bee-keepers, very little attention has been given to the subject, some general ideas gleaned from the studies of advanced apiarists may be of interest. Were the question to arise here to-night as to the source from whence *sweets* were obtained, before the sugar cane was brought from its native India and domesticated in Europe and the more Western world, how many could give an immediate and intelligent answer? We are told, that although there are evidences of the very high antiquity of the sugar industry in India and China, yet its development in all other countries is of comparatively recent date, and that the introduction of the sugar cane into Europe appears to have been one of the results of the

Crusades. It was grown in the island of Cypress about the middle of the twelfth century, from thence, at a later time, transplanted to Madiera, and at the commencement of the sixteenth century, was carried from the latter island to the West Indies. The first sugar refinery of which we find any notice, was one in Dresden about the year 1600. Still, the manufacture of sugars in the countries to which it had been introduced, made but slow progress, and on account of its dearness, its use was limited to the wealthy. Sugar appears to have been but vaguely known to the ancient Greeks and Romans. A line from a Latin poet indicates a knowledge of its existence merely as a curious fact.

Antiquity of Bee-Keeping.— The question, from what source did all the teeming populations of ancient times and of the succeeding middle ages obtain their sweets, becomes one of considerable interest. As possibly affording some clue to the solution of this question, there may be found, it is said, in one of the earliest extant treatises on botany, written in the third century before Christ, an allusion to "honey in reeds"; just as a similar treatise at the present day might contain an allusion to "sugar in beets." The phrase is certainly a very suggestive one, and appears to indicate that the word *honey* at that time was used in much the same sense as is the word sugar with us. More than two thousand years have passed since the ancient botanist wrote his treatise; and the curious honey producing reeds, of which he knew so vaguely, have made their way around the globe, and played their part in shaping the civilization of a new hemisphere. How familiar to our ears have become the accounts in the Bible of the "land flowing with milk and honey." And now among the old land-marks that are being swept away by the relentless searchings and siftings of the modern student, in both sacred and profane records, we are told that this familiar phrase might perhaps, be more properly rendered, "a land flowing with milk and grape juice." What a startling idea! If mankind progresses in circles, or in spirals, we might almost imagine, that we, in our day, had just arrived at the same identical point again. Grape juice, indeed! Let us hasten forward to the safe ground where the bee is monarch and queen. The earnest Semitic and Indian records, Egyptian sculptures and papyri, as well as the poems of Homer, all testify to the early cultivation of bees, by man, for domestic purposes. And their frequent representation, in Egyptian hieroglyphics, wherein the bee occurs as the symbol of royalty, clearly shows, that their economy, with a monarch at its head, was known. A hive, too, figured on a very ancient tomb at Thebes, is evidence of the early domestication of the bee there; and of how early, even historically, it was brought under the special dominion of man.

Bee Literature.—It was estimated, over three hundred years ago, by De Montfort, who then wrote a work on bees in French, that between five and six hundred authors had preceded him on the subject of bee-keeping. Most of these books were written in Latin and are lost to the world, very few having been handed down to us. From remote antiquity the practice has prevailed in Egypt of collecting great numbers of hives in vessels on the Nile, and transporting them from pasture to pasture according to the succession of flowers in the different districts. A somewhat similar practice prevails on the Rhone in France; and the conveying of bees from place to place, has been usual in Greece, Asia Minor and Persia, from the earliest times. Strange to say, it is claimed that the honey-bee was not a native of the western continent. We are told that, without doubt, there were no honey-bees here until introduced by the Caucasian race. This seems the more strange as, it is said, that all the continents and islands of the eastern hemisphere abound with them. It is one more illustration of the inextricable puzzles connected with the geographical distribution of animals. Mt. Hybla in Sicily, on account of its great variety of odoriferous flowers and abundance of honey, has been poetically called the empire of bees, and Hymettus in Attica is in the same way famous. The German black or brown bee is the variety best known; as through all the ages, it has been most widely distributed. We find, however, that the Italians were known, both to Aristotle and Virgil, who sang of the variegated, golden bee. It is said that the wider distribution of the German bee can only be accounted for by considering the more vigorous, pushing habits of the Germanic races of men; who not only overran and infused new life into southern Europe, but have vitalized all Christendom.

An Important Industry.—At the annual meeting of the North American Bee Keepers' Society, held at Detroit in 1885, President Willets, of Michigan Agricultural College, in his address of welcome, used these words:

"Yours is no insignificant industry. You represent three million colonies of bees, with an annual product of surplus honey of a hundred million pounds, and the production is annually increasing. The best minds in the field of science have contributed to the more successful promotion of the industry. They have studied, observed, experimented and written about bees and their habits, until we know how best to rear them and how best to utilize their harvest of sweetness; so that, to use the words of a learned judge of one of our courts, the bee has become almost as completely domesticated as the cow. Its habits and its instincts have been studied until it can be controlled with nearly as much certainty as any of our domestic animals, and there is far less danger of serious injury from the bee than from the dog. For many years the burden of the efforts of our most prominent apiarists has been to induce our government to extend to apiculture proper recognition and protection, as one of the important national industries."

One result has been, that through the efforts of Prof. C. V. Riley, of the Agricultural Department at Washington, and others, the government has established an Apicultural Department, and is conducting an experiment station at Aurora, Ill., under the charge of Mr. W. McLain.

Special Education.—The Michigan Agricultural College also makes a specialty in bee culture, having established an experimental apiary, in charge of Prof. A. J. Cook, where pupils may receive practical instruction in the habits and propagation of bees. The managers of State and county agricultural fairs have also done much to encourage this industry, having sometimes offered premiums amounting to several hundred dollars, for the best display of bees, honey, and implements for the apiary. In his maunal of the apiary, Prof. Cook says:

"Apiculture, in adding so immensely to the productive capital of the country, is worthy, as an art, to receive the encouragement and fostering care of the State. All this annual crop of a hundred million pounds of gathered nectar woud go to waste, were it not for the apiarist and his bees. Millions of wealth are annually lost to the world, through ignorance of bee-culture; for it may be doubted if, in almost any district of country, the number of bees kept is so great as nearly to exhaust the floral resources; and in all probability, this industry may yet become a much greater source of wealth than it is at present. Already a large amount of honey is annually consumed, in the various industries, of pork-packing, tobacco, and other manufactures. The commercial value of beeswax is also very great, and if it were possible to ascertain the total of the quantity produced, it would cause great surprise at the amount of valuable material derived from a source apparently so insufficient. Mr. Robert Eldridge, of Cincinnati, Ohio, states the annual yield of wax in Russia alone, to be nearly 5,000 tons; and this is nearly all consumed at home, so large is the quantity required in the ceremonies of the churches. Nearly 500 tons are annually imported into Great Britain."

In Germany, bee-keeping is taught in many of the public schools; and the government also provides instructors in the art, who go from town to town, as their services are needed. The Germans understand the science of economy too well to allow the wealth thus stored in their fields and forests, to go to waste; and it is said, that in Switzerland, honey is as common an article of food as is butter in America.

Fertilization of Plants.— Prof. Cook, in an article on Horticulture, says:

> "Many of our flowers, such as clovers, squashes, and fruit blossoms, fail of fruitage, unless some insect bear the pollen of one blossom to the pistil of anoher. It has been repeatedly demonstrated, that if these plants be screened from insects, the yield of seed and fruit will be but partial."

Prof. Beal and the students of Prof. Cook's class, have tried some very interesting experiments of this kind with red clover. All the plants under observation were covered with gauze, that the conditions might be uniform. Humble-bees were placed under the screens of half these plants. The insects, at once, began to visit, and sip nectar, from the clover blossoms. In the fall, the seeds of all the plants were counted, and those from the plants visited by the humble-bees were to those gathered from the plants shielded from all insect visits as 236 to 5. Thus we see why the first crop of red clover is barren of seed; while the second crop, which comes of bloom, visited freely by humble-bees, whose long tongues can reach down to the nectar, at the bottom of the long flower tubes, is prolific of seed. This fact led to the importation of humble-bees from England to New Zealand and Australia, a few years ago. There were no humble-bees in Australia and adjacent islands; and the red clover was found impotent to produce seed. Alsike clover, a hybrid between the white and the red, has shorter flower-tubes, which makes it a favorite with our honey bees; and so it gives a full crop of seed from the early blossoms. When Mr. McLain has developed the coming American bee, with a tongue seven-sixteenths of an inch long, then our farmers will be able to raise seed from the first crop of red clover; as the honey-bees, unlike the humble-bees, will be numerous enough, early in the season, to perform the necessary fertilization.

Location of Apiary.—In locating an apiary, of course this matter of bee-pasture is the first to be considered. In this locality, a great part of the honey crop is gathered from white clover; though occasionally something is obtained from dandelion, apple-bloom and linden. I have never been able to obtain anything whatever, from buck-wheat, or from any fall-bloom. I began to keep bees in the spring of 1884, with two colonies of hybrids, in old-style box-hives. Never having examined a colony of bees, nor seen a swarm, my knowledge of the business was entirely theoretical. A good deal of time had been given, during the previous winter, to the study of various bee-books and periodicals, treating on the subject; and some lessons in the use of a handsaw and a ladder were attempted in a very private way, in which necessity was the only teacher.

Implements for the Apiary.—Various implements necessary in the hiving of swarms, and in other difficult operations, had been prepared. Thus equipped, matters went well that first season —much better than there appeared reason to expect, from a first effort. Perhaps two-thirds of the time, during all those spring, summer and autumn months was spent in the apiary working, watching and experimenting. On account of the difficult nature of the work, it is not thought advisable, for a beginner, to undertake the care of more than a very small number of colonies. And it might be as well to understand, at the very outset, that without a genuine love for the pursuit, it is probably, worse than useless to attempt to engage in it, as it has been estimated that not more than two per cent. of all those who undertake the business make it a success. They like the honey, and the money, but are not particularly partial to the society of the bees,—especially when the remarks of the latter, become somewhat pointed and personal.

Enthusiasm Will Succeed.—Enthusiasm will carry one through many difficulties and thus, by means of natural and artificial swarming, the result of the first summer's work was an increase, from two to ten colonies; seven of which were placed in the cellar for winter, and three packed on summer stands, and the following spring found every colony in excellent condition. Thus far, success in wintering has been my one strong point, and whether placed in cellar, or left on summer stands, no colony has ever failed to come safely through the winter. And as successful wintering onght, perhaps, to imply successful beekeeping, it may be well to describe the methods by which this success has been obtained, and then decide whether, as appears to me, it has simply depended on providing abundant food and warmth. In studying this subject of wintering, my attention was early drawn to what appeared to me two very importaut conditions, necessary in attaining the best results; i. e., contraction of the brood chamber in winter and early spring, and profection after removal from the cellar, from the cold waves of the spring months.

The Hive.—The problem involving the method by which these desired results might be obtained, defied all attempts at solution for many months. But after much study the answer slowly evolved itself out of the chaos, and crosswise frames, in Langstroth simplicity hives, secured the two-fold advantage of contraction of the brood chamber and spring protection. On the approach of cold weather, chaff division-boards, two inches thick, were placed all around the inside of the hive, thus contracting the brood chamber one-half. Six or seven cross-wise frames, containing not less than thirty pounds of clean stores, were then hung lengthwise in the snug nest, thus economizing heat, and bringing all stores within easy reach of the bees.

Stored in the Cellar.—Thus packed, and placed in the cellar with chaff cushions over the frames, the temperature has been sometimes allowed to descend almost to the freezing point, without visible effect upon the bees, and thus protected they have been removed to summer stands in spring with entire freedom from that most disheartening of all diseases to the beekeeper,—"spring dwindling."The temperature of the cellar has varied from 35° to 50°, remaining most of the time at about 40.° For outside wintering, each hive after being packed as above described has an additional outside case, or dry goods box placed over it packed with three or four inches of chaff.

Protection of Colony.—A colony thus protected, with two inches of chaff inside the walls and three or four inches outside with chaff cushions above the frames and abundance of stores within easy reach appears to defy the effects of our very coldest weather. This method of packing inside the hives involves a greater amount of labor than most beekeepers think it profitable to perform, but its exclusive practice in my own case, has resulted in perfect success, as I have never lost a colony.

Spring Protection. — Mr. W. Z. Hutchinson, of Rogersville, Michigan, speaking of the absolute necessity of spring protection, advocates an outer case with packing of chaff or saw-dust to be placed over each hive when removed from the cellar. This does not secure contraction of the brood chamber, but the construction of the Heddon sectional hive which he uses itself secures contraction. Now as to styles of hive and methods of securing the honey crop —they are almost as numerous and as various as are the beekeepers. Each beginner must select, as best he can, his hive, and his method and follow out the latter if the bees will permit until he has evolved a method of his own.

Profits.—As to profits, I can only say, that my credit page shows a balance something like this: Forty colonies of bees, twenty-five additional empty hives and a tolerably complete supply of fixtures. To these may be added the benefit of four years experience, and greatly improved health. As it is not proposed further to increase the stock each colony ought to yield hereafter an annual surplus of fifty pounds of honey. Some beekeepers say 100 lbs and some even more than double the *latter* amount. But these are mostly men. Women have better judgment than men and are more moderate in their expectations, and thus they reap the advantage of being less often disappointed.

Honey for Market.—A few words might be said as to the manner of preparing honey for market. In my experience, the first and most indespensible requisite in the production of a fisrt-class article is that the honey should be completely capped and ripened by the bees. To this end, the practice of the so-called tiering-up system appears indispensible and, if it is designed to find a market in the large cities, it seems best to use the highest priced white poplar sections and shipping crates,—the latter to hold no more than one tier of sections and not over twenty-five pounds. There also appears to be a demand for a neat small six pound crate. By the use of tin or wood separators between the sections while being filled, a beautiful uniformity may be secured and these uniform sections may be shipped with much less danger of leakage. The removal of all propolis or bee-glue from the sections should never be neglected if it is desired to place upon the market a first-class product. All these precautions necessitate a very great amount of extra labor.

A Labor of Love.—Thus far this has been a labor of love with me and done without much expectation of reward other than the satisfaction of doing good work. For, outside the large cities, honey is usually *honey*, if the quality is good, without much regard to its general appearance. And now the question is being continually asked, "is bee-keeping a good business for women?" It would seem that in this artificial, high pressure age, with its stimulous of hot-house culture and the dire necessity of keeping up with the crowd, that *any* occupation tending to lift man out of himself and bring him nearer to nature, must be a blessed boon, and especially so for women with their more sedentary employments.

A Farmer's Life.—In the same way it would seem that a farmer, taking life, as it were, at first hand, must occupy the most healthful, natural and proper position in which it is possible for man to be placed and that, thus placed, he might be most likely to secure immunity from the hurry and worry of nineteenth century unrest and the dread malady of thought — of unavailing and fruitless conjecture. In the struggle for existence how often the question will arise as to who is fittest to survive. Is it the generous, the pious, the noble-hearted, the forgiving, the humble, the truthful, the honest and the kind—or those who are strongest in selfishness, in craft, in hypocrisy, in brute force, in false pretence, in unscrupulousness, in cruelty and in avarice? Alas, how many will fall by the way, mental or physical wrecks.

A Panacea for Human Ills.— Let one suffering from the attacks of this latter day disease — too much thinking — try, for instance, as a remedy, *pulling weeds*. It has been affirmed in all seriousness by one who knows whereof he speaks, that *pulling weeds* has more than once proved an antidote for many of the ills of life. Let him try cultivating a strawberry patch and breathe the odor of the freshly turned earth; let him try keeping a colony of bees and see what free air and sunshine will do for him, and if possible, let him accompany his army of little work people to the woods for an hour and watch them as with their tiny brushes and baskets they gather the pollen from the elder tassels in early spring, or listen to their murmuring music as they sip the nectar from the linden blossoms in later summer. Let him there inhale the life-giving essences of balsam and pine, of mosses and ferns and wild flowers. So potent is nature in her powers of healing that could he spend a month here in the heart of the forest he might, perhaps, on his return to civilization, pass unrecognized among his nearest friends.

A Plea for Broader, Fuller Life.— Let the farmer give his boy and girl a corner for a flower or vegetable garden and a colony of bees. It may tend to keep them on the farm, and strengthen their love for country life. It will not, in any case cost much, and may be the means of adding one less to the ever increasing number, who, without definite aim, crowd into the large cities, where, if no worse happens, independence and individuality are too often lost amid the whirl and excitement of the hurrying throng.

Conclusion.—A modern philosopher tells us of a sort of mental gravitaion, for which we, as yet, have no name — by virtue of which it is deduced that if one man in twenty thousand, or in thirty thousand eats shoes, or marries his grandmother, then in *every* twenty thousand or thirty thousand will be found one man who eats shoes and marries his grandmother. If this principle be true, it may not seem too improbable to infer that one other woman here present to-night may also find her tastes and inclinations turning in the direction of bee-culture and that, thus, this poor attempt to give a few facts and hints on the subject may find its sufficient excuse.

HORSE SESSION—MARCH 29.

THE CARRIAGE HORSE.

By A. O. FOX, Dane County, Wis.

First Paper.

A Handsome Team.—A short time ago I had some business in a neighboring town. About noon there came into town a man driving a handsome team; they were bays with nice, flowing tails; they weighed about 2400, and seemed to have a nice turn of speed. They were hitched to an old bob-sled, and had on rather a hard looking harness, but, nevertheless, everybody turned to look at them. They were toppy and, like old Bobby Burns' best girl (or rather one of his best, for he had the failing of his countrymen), there was "something in their gait, gard ond dress look weel." I concluded I would spot that team, and quietly sauntered along toward the stable to have a little chat with their owner. When I got there, I was surprised to find several others on precisely the same errand, as myself. But the worst of it was the team had already been sold to go to New York at $600. These were carriage horses.

Points.—The carriage horse must be proud and commanding in his bearing and of good size. He must stand 15½ to 16½ hands high, and weigh 1100 to 1300 lbs. His color must be clear and rich, and without bad marks. His shoulders should slope gracefully back, and he should stand well up in the withers. He should carry a lengthy, well arched neck, surmounted by a cleanly chiseled head, free from meat, and with the visage of a thoroughbred. His back should be of medium length, not too much inclined to arch, and coupled strong in the loins to a long, smooth hip. His tail should come out well up, and float gracefully behind when in motion. He should have a good depth of girth, and a well sprung barrel. His limbs and feet should be absolutely sound, not too long between the joints, and not too straight in the hind legs, that he may have his feet well under him and have easy, graceful hock action. His action should be high, bold and square, and with sufficient speed to roll off eight to twelve miles an hour with ease and grace. His disposition should be spirited and intelligent.

A Source of Pride.—Wherever this horse is employed, whether in the plow, on the road, or before the family carriage, you find him performing his duty with ardor, energy — a source of pride and satisfaction to his owner.

Demand and Supply.—That there is a strong demand for these horses, and a very meagre supply, is beyond question. Our Eastern and Southern markets are daily visited by representative buyers, not only of this country but of Europe, greedily seeking to capture every fine carriage and park horse they can lay hand on, at prices which yield very handsome returns to the careful breeder. At Lexington, Ky., I recently met a gentleman who was buying carriage horses for a firm in Liverpool. I saw him pay $1,600 for a pair of nicely matched five-year-olds. They were bays with black points, 15½ hands, and weighed about 2,300 lbs. They could trot in about 3 minutes, and were standard-bred. This gentleman told me he had great difficulty to find such; that they were either too small and plain or too sluggish and drafty in appearance to meet the requirements.

Good Coachers Scarce.—In a letter recently received from a firm of extensive horse dealers, of Chicago, they express their views as follows:

"We are dealers in coach and driving horses; can see at a glance how very scarce good coachers are becoming all through the country, and it costs no more to raise a coacher than a draft horse, and you get nearly if not quite *double* for him. It seems as though the breeders have entirely lost sight of all classes of horses but heavy ones."

Great sums of money have been invested in breeding the American trotter.

The Draft Horse Interest.—The breeding of draft horses has reached vast proportions. To say nothing of the growing horse interests of the Eastern and Middle States, we find horse ranches of great wealth and magnitude in the West. Among them are the Post Percheron Horse Co., of Wyoming, with 4,000 horses; The Percheron Norman Horse Co., of Colorado, 5,000 horses; Blunt & Evans, of Oregon, with a ranch of 7,000 horses. These are but samples of the many.

Carriage Horse Breeders.—Where shall we turn to find breeders who are making a specialty of carriage horses? I can name but several. Would it not seem wise, therefore, that we heed the lesson now offered us by the present condition of our cattle trade? When so many are now bent on the two extremes—flyers or drafts—is there not a golden opportunity for some of the conservative ones to take the middle course, and breed a fine type of carriage horse.

How to Produce Coachers.—With our close proximity to the largest and best city markets, and the shipping facilities which we enjoy, we can breed and place upon the market, this class of horses, in such form and condition as to be beyond the reach of Western competition. How to produce them is the problem. We have had offered to us as sires, the American standard trotter; the imported French Coacher; the imported Cleveland Bay, and the English Coach. These are all valuable to us, but must be used with great care and judgment. I am disposed to believe that the produce of the Cleveland and English Coach will not be generally satisfactory except when out of dams strongly trotting bred, as the get will lack the speed required by the average American, and they will lack uniformity, and will also be inclined to coarseness and soft feet. This is especially true of the English Coach.

The Cleveland Bay — As he is offered to us by the various importers, is certainly not highly enough bred, and is lacking in quality. I have seen them with very heavy bodies, supported by far to light a set of limbs, cut away at the joints, and an indication of coarse hair on the ankles. I have seen a few of the grades, and did not like them. I find my limited observation is backed by the experience of two very high authorities. The one is none other than the president of the

Cleveland Bay Society in England, in his address which is published in the London Live Stock Journal. My other authority is Stonehenge, one of the most celebrated English writers upon the horse, who treats of the Cleveland Bay in a chapter headed "other mixed breeds." That the Clevelands possess a great amount of English Cart blood is abundantly evident from perusal of some of their pedigrees.

The French Coacher.—I have seen but a very few grades got by French Coachers, and can scarcely express an opinion. The French Coachers are a product of the Arabian horse and the English thoroughbred and their get ought to be fine styled; but as to their gait, I believe they will not produce sufficient speed, although it is claimed that some of them trot in France. I also believe that the color of the get will not be sufficiently uniform to be satisfactory. I have noticed several imported French Coachers with very bad white markings, a great objection in carriage horses.

The American Trotter. — While some of the American trotters are under size, yet I believe that, up to the present time, they have given us the greatest number of our best carriage horses, and I believe that to the largest and best styled types of the standard American trotter, we must look for our sires. So far as my personal observation has extended, the finest carriage horses I have ever seen were got by sons and grandsons of Mambrino Chief and out of dams by old Indian Chief, or his son. Indian Chief was by Blood's Black-Hawk, he by Hill's Vermont. The dam of Indian Chief was by Ned Forrest, (Not Edwin) by young Bashaw, he by imported Grand Bashaw.

Indian Chief's 2d dam was by Douning's Bay Messenger, the latter breeding though both sire and dam to imp. Messenger.

The Kentucky Highlanders have also produced many fine carriage horses.

Results by Crossing.— I have seen very excellent results produced by crossing large Mambrino and Hambletonian sires on dams of the now nearly extinct Morgan type, and mares from that branch of the English Coach family which relate to the celebrated Rainbow Rockingham stock; Rainbow Rockingham was a son of North Star, and I believe traced directly thence to a thoroughbred. This English Coach cross has some objectionable features, however, among which is a tendency to feather about the limbs and a little coarseness, and the feet none too good.

A Hint to the Wise.— It will be noticed that all these families named run back not very remotely to the thoroughbred, from which fact we may gain a hint for our future benefit; provided always, that we select animals which have been properly toned down by judicious admixture of the best American trotting blood, and of the largest families. It must be remembered that the thorougbred is no longer a very small horse. Many of our best thoroughbreds are large enough. I have seen imported animals weighing 1200 to 1350 lbs. I think imported London will weigh over 1200 lbs. But we do not need to go so far for what we require, since the very blood and characteristics we desire are embodied in some of our best American trotting families.

We may, therefore, select such standard trotting-bred sires as approach nearest to our ideal of the carriage horse, and which have shown their ability to impart to their offspring the required characteristic of size, style, color and soundness.

The Mare—Should approach the nearest possible to the required type standing 15 to 16¼ hands, and weighing 1,150 to 1,300 lbs. She must have a kind disposition, nice style and action, and rich, solid color. She should have a good tail, well carried; a smooth even contour, free from coarseness about the hips, although if she should be a little open in the ribbing-up, she is likely to be all the better breeder for it. She should stand well up in the withers; her neck good length and rather fine, with a moderate sized bony head. Above all, she must be a mare of good nerve and vigor, with a clear, full, expressive eye, indicating that she has intelligence and power, and a desire to use it. Such mares will usually be found to contain a predominence of good trotting blood, and, although they may fall considerably short of being standard-bred, they are a useful and valuable class of matrons, and within our reach.

Breed to a Purpose.—But we must breed close to a definite purpose. If we ever wish to produce valuable carriage horses we must keep clear of the undersized, low-necked, low-striding trotter, as also of the cold-blooded, heavy draft horse, although each may be right in its sphere.

Breed From the Best.—We have now reached that epoch in stock breeding when we must breed from the very best attainable, if we would cope successfully with the strong competition which surrounds us. If it be a draft horse, let him be the best of recorded sires. If it be a carriage horse or a trotter, select from the best families of standard, registered, American trotting blood.

An American Product.—In breeding the American carriage horse, we have a great advantage in the fact that we do not need to go abroad for our sires, nor depend upon imported pedigrees. We can select them intelligently, after having seen their sires and dams and knowing their history. They are strictly an American product, and in their patronage and improvement we are aiding in the establishment of a valuable American breed, which is already a wonderful example of what selection and education will do, and which has excited the admiration and opened the purse-strings of the world—the American trotting horse.

HORSE-BREEDING IN WISCONSIN.

By JOHN M. TRUE, Baraboo, Wis.

Second Paper.

400,000 Horses.— There are some 400,000 horses in the State of Wisconsin. Their valuation, as given by our last census report is approximately equal to that of cattle, swine and sheep combined. An industry bearing so close relations to the interests of the farmers of the State, and of such grand proportions, is entitled to our careful consideration. In opening the discussion upon the topic of horse-breeding, taken in connection with other farm enterprises, I wish to speak specially of that work as carried on by the average farmer, and to claim for it a degree of pleasure and profit equal to any other live stock enterprise.

The Best Success — In this field requires a natural and well-developed love for the work, an intelligent appreciation of the animal handled, and a business tact that recognizes the demands of the market, and brings its products to meet the requirements of such market. Men of means, who make the raising of fine farm stock merely a diversion, regardless of the elements of profit and loss that result from these enterprises, do not come within the limits of this paper. But for the horse-breeding farmer to blindly interpose his prejudices or whims, as applied to lines of breeding, and the quality of the animal he shall raise, between his financial interests and the market, is a kind of folly that reflects seriously upon the intelligence and business capacity of its possessor.

Few farmers can safely make the raising of horses a specialty to the extent that dairying, beef production and sheep husbandry are frequently carried, for except for special work, labor upon the farm and the raising of colts should be a combined interest.

Keep Brood Mares.— The farmer who has been accustomed to do his farm work with one team of horses, kept specially for work, and worked hard, may profitably keep four brood mares instead. The work will be more satisfactorily done, while the production of four good colts annually, will add very materially to the income from the farm.

Fall Colts.—When the brood mares are made the work animals upon the farm, fall colts may be raised to such an extent as to prevent those interruptions in work which might occur from the exclusive raising of spring colts. The fall colts, running with well-fed dams during winter, make a very satisfactory growth during that time, and go upon pasture in the spring on nearly equal terms with their spring cousins of a few months greater age. The fall colt at eighteen months is often equal in size to the two-year-old spring colt of similar breeding.

Inducements.—The statement that no more feed is required to keep the good colt than the good steer of equal age, or the boord mare than the dairy cow, is accepted by all intelligent handlers of good stock. From these premises we enter the claim that no live stock industry offers equal inducements to the Wisconsin farmer to the raising of good horses. To substantinate this statement, we have only to cite the uniform, continued and persistent demand for good horses that has prevailed for years—a demand that increases in direct ratio to the improvement of our stock, unaffected even, by means of drouths that have seriously depressed the prices of other farm stock.

Kind to Raise.—What kind of horses shall the farmer raise? The horse that he is best adapted to handle; that his taste and capacity enables him to produce at the greatest net gain, due consideration being given to the cost of raising and handling, and the certainty and uniformity in quality and selling value of the entire product of the enterprise

This bars from consideration, first the miscellaneously-bred horse, the result of ignorance, parisimony and prejudice; the product of an indiscriminate hap-hazard co-mingling of all popular bloods of the past fifty years, giving us, to-day, the horse that is oftenest found upon our farms, and that, through lack of size and lack of quality, richly deserves the epithet, "scrub." Second, the *little* trotting horse. This animal may be a source of diversion, and, in special instances, of profit also, to men of leisure means and reputation in their chosen work but, while he may be well bred, his breeding has looked to the production of a special-purpose animal, and the purpose is so difficult of attainment, so uncertain in its degree of excellence, that he cannot be profitably bred by the average farmer. Failing to develop speed, his light weight renders him undesirable, and in the general market, this waste product ranks little better than the scrub. Size has come to figure very strongly in the requisites of the market horse. It is demanded in the typical roadster. It is a necessity upon the farm. There seems to be no limit for the admiration for it in the draft horse.

The Fine Roadster.—To the farmer of fine taste and discrimination, who readily recognizes style and finish in the horse, and is systematic and persistent enough to back these qualities with proper feeding, shaping and handling, the production of the fine roadster, offers an enterprise worthy of his best work. Between the breeding of the trotter, and the draft horse that has in the past claimed most attention, the fine roadster has been neglected, and to-day a rangy, stylish, high-stepping horse, of good color, weighing from 1100 lbs. to 1300 lbs., brings a high price to the lucky owner. The great barrier to the supply of the popular demand for these horses, is the lack of suitable dams for the work, animals of sufficient size, style, and finish being rarely found upon our farms. Dams of requisite quality, crossed with larger types of our American-bred trotting horse, or the French coacher, animals weighing from 1,200 to 1,400 lbs., should, with tolerable surety, give us excellent results.

The Heavy Horse.—But, from the excess of the demand for, and the uniformity of the product obtained, the lack of necessity of special adaptation to, or skill in the work, a large proportion of our Wisconsin farmers will do best to devote their attention to the heavy horse. A cross of the full-blooded Percheron, Clyde or Shire sire, with judicious selections from the dams found upon our farms, will give us a class of hardy, strong boned colts of attractive appearance, early growing to the size and form that meet the market requirements, at highly renumerative prices.

No special handling or breaking is necessary to put them upon the market. Buyers will come to the farm and purchase this stock when three or four years old. Blemishes, bad markings or unsatisfactory colors, that would seriously interfere with sales of roadsters, do not so materially affect the price of the heavy horse.

Superiority of Breeds.—It is not proper at this time to enter into a discussion of the superiority of breeds. The Clyde, Percheron or Shire are each worthy of our best consideration. But the breeder should thoroughly believe in his favorite. He should, therefore, before entering upon his work, satisfy himself of the superiority of the breed he selects, and thereafter zealously defend and persistently patronize it, Cross-breeding, even of the draft breeds should be discountenanced. Do not try to breed the "general-purpose horse." He is an uncertain quantity, about whose form, size and movement great difference of opinion exists even among those who claim to believe in him.

By breeding as best we may for the production of the roadster, we shall find quite a percentage of our product not equal in form or style to the requirements of the market. These will satisfy a portion of our general-purpose men, who do not choose to keep the best roadsters for general work. Not all of the colts raised for the heavy horse market will be sufficient in size to bring the best prices. These lighter weights, weighing from 1,200 lbs. to 1,400 lbs. are admirably adapted to the wants of the general farmer.

The Best Results.—We may expect the most satisfactory results from breeding for the best types of these two special lines, rather than from a use of grades, or "compromise" horses. It is fortunate where communities can unite in the raising of some special kind of horse. The common interest enables them to secure better breeding stock, a local pride in the project is established, a uniformity of product is obtained, and buyers are enabled to pay better prices when they can find car-load lots of such horses as they want, at a single point, rather than to be compelled to pick them up in different localities.

Feeding and Handling.—In order to attain success in the raising of horses, a recognition of a few general principles of feeding and handling our brood stock and colts is important. The raising of colts has been considered a less certain work than the rearing of the young of our other domestic animals. Especially has the loss of colts at birth, or soon after, been so great in some localities as to render horse breeding unpopular. Believing, as I do, that under proper conditions the colt may be as safely raised as the calf, I wish to consider the importance of proper food and exercise in producing successful results.

Weakness of the Young.—In communities, or in individual cases, where general complaint of weakness of the young has been made, the cause has usually been traced to insufficient or irregular exercise, and a too generous feeding of grain to breeding stock.

Both sire and dam should have abundant exercise, ether given regularly in harness or by their being allowed a free run in a commodious yard. A box stall is insufficient room for exercise. These animals should never be fat. Good hay, straw and wheat bran, should mainly constitute their feed. Corn, corn-meal, barley and molasses, and other corbonaceous food, given to put the animal in good show condition, should be discontenanced, and the breeder should not only see that his brood mares are properly fed and handled, but should also insist that the sires be similarly treated. Avoid abrupt changes in the feed of the brood mare during the period of gestation, especially a sudden change from dry to green feed in the spring. Under these circumstances, exercise and accustomed food is best continued until after the birth of the colt. It is all important that the colt should be generously provided for, that his growth and development be constant and continuous from birth. The young animal that is early stunted never fully recovers from the ill treatment. If the dam is worked upon the farm, the colt should be allowed to eat grain with its mother.

If allowed to run with the dam until it is five or six months of age, its growth will be much more satisfactory than if weaned younger. Shut in a roomy box stall at weaning time, feed small quantities of fresh wheat bran and oats often, and supply with fresh water and good hay. Do not allow the colt to fall off in condition, When sufficiently weaned, give a run during the day upon fresh pasture, giving shelter during storms and at night, and continue a generous grain ration.

During the first winter the colt may be allowed to eat all the oats and wheat bran of equal parts that it will take, if it be allowed daily exercise in the open air. This combination produces the best quality of bone and muscle. Starvation and exposure are not essential in rendering the coming horse hardy and vigorous.

The Draft-Bred Colt — Should be handled for early maturity. If two and a half years is the limit of profitable feeding of steers for beef, if hogs pay best that are sold at eight or nine months of age, the same practical principle applied to the colt, would put him where the market would want him at from three to four years of age. At this time he should weigh from 1,300 lbs. to 1,400 lbs., and bring from $150.00 to $250.00.

The draft colt is a *horse* upon the farm when three years old, and perfoms his work to the satisfaction of the judicious driver and without detriment to himself.

Improvement of Stock.— In conclusion, allow me to say that while we can profitably raise many more horses than we have been raising in the past, the improvement of the quality of our stock is of first importance. If the 150,000 horses in Wisconsin to-day that weigh less than 1100 lbs., and are of so inferior a quality as to represent a merely nominal value in the market, were, without increase of number, such animals as judicious breeding and intelligent feeding would produce, they would represent an increased valuation greater than the entire estimated annual dairy product of the State; greater than the combined valuation of hogs and sheep upon our farms, and nearly double the amount of our annual beef production.

Demand Increasing.— Year by year the demand for good horses increases. Quality is recognized by increased prices. In common with other farm enterprises the demand is for better work. It requires 250,000 horses annually to supply the Chicago market, and nine out of every ten of these are for work. Horses are to-day doing duty upon our city drays, express wagons, omnibus and street car lines, as well as in our pineries and mining regions, that are unfit for their work from a lack of weight, and they will only be tolerated until better and heavier teams can be obtained to fill their places.

No Danger of Over-Production.— Is there danger of the production of good horses being over-done? When the prejudice, penuriousness and shiftlessness of the American farmer gives way to opposite qualities, and the best principles of breeding and methods of handling prevail universally, when too many farmers do their work too well for it to be remunerative, this question may be seriously considered.

So long as quality is intelligently and persistently made superior to quantity, with the peculiar advantages of our climate and soil, imparting vigor and producing feeds adapted to the work, the raising of good horses promises as well for the interests of the Wisconsin farmer as any other industry.

Discussion.

MR. URQUHART.—I would like that Mr. True be allowed five minutes to present the merits of the heavy draft horse.

MR. TRUE.—It seems that that is the only horse which is not presented here, and I wish to say, while I concede what has been claimed for the other classes of horses, and especially the carriage horse, yet I consider the interests of the average farmers of the state of Wisconsin when I champion the heavy draft horse. I have in mind the certainty with which it is raised, and the uniformity of the product, and think that many men who would make a failure should they attempt the raising of the carriage horse, are raising the heavy horses and attaining thereby a degree of prosperity they probably would not in any other similar enterprise. While I am willing to grant all that may be just to the raising of the fancy breeds that are required by the market, still I think that the public mind should not be diverted from the fact that the sure means of making money upon the farm by the average farmer without skill or especial adaptation to his work remains in the production of good heavy horses for the market.

MR. FISH.—As a matter of fact, the farmer will use, as breeders of the farm, the same horses as he uses to do the work. He can't afford to keep two sets. It seems to me to be very necessary in order to increase and improve our horses upon the farm, that we keep none but the best. Consequently my plan would be to keep only the best for breeding purposes, and sell those that we do not consider first class, and in that way, we can, in a few years, very materially improve the horses that we have in this country.

MR. ROGERS.—I have listened to the discussion on the horse question with a good deal of interest, but I have yet to learn from it whether the draft horse business can be made profitable by farmers having small farms. I want to ask Mr. True whether the rearing of draft horses in Wisconsin can be made a specialty so that a farmer on land worth from forty to sixty dollars an acre can buy his dams and his sires and then sell at say $200 a head at three or four years old, and make a success of it without having anything else for the dams to do?

MR. TRUE.—It will be remembered that I addressed myself particularly to the average farmer, and I believe, from my experience and the experience of my neighbors, that, when his farm is adapted to the enterprise, it can be made as profitable as any other branch, at least, of farming. It is a fact that a colt upon a farm is raised as cheaply if not more so than a steer or a heifer of a corresponding age. It is a fact that it requires probably less to feed and to keep the brood mare under the best conditions than it does the milch cow. It is also a fact that heavy horses raised in the State of Wisconsin are worth more to the business to which they are adapted than those that are brought over from Iowa, Illinois or other States, from the fact that our climate and our methods of feeding are better adapted to the production of good horses. It has been stated to me that the horses in the pineries, coming from the more Southern localities, are much more frequently lost in becoming acclimated than our Northern horses.

THE TROTTING ROADSTER.

By Dr. S. M. BLAKE, Columbia County, Wis.

Third Paper,

The Favorite of Man.—The horse above all domestic animals is the supreme favorite of man. In the toils and pleasures of home life, he is the ever willing, and faithful servant. In the drudgery of the farm and dray, or the "pleasure rides of lovers," he brightens our burdens and adds to our joys. He bears from the country-home to the village church, the worshipping families of our land upon each returning sabbath. He is the ever swift messenger to go for aid when sudden calamity has befallen any of the beloved ones of home, and to the physician he is more than a servant —he is a companion; and when to us the toils and pleasures of life are ended, it is the horse that draws with measured tread the funeral hearse.

Horse Enthusiasts.—When we contemplate his usefulness in civilized life, it does not seem so strange that now and then we find an enthusiast, a man who is "cranky" and "horse crazy" upon his particular favorite, and in calling the attention of Wisconsin farmers to the trotting horse, I am free to confess that he is my favorite, and the one above all others to be perpetuated by the average farmer; for it is from the larger families of trotting horses, that the "general-purpose horse" is to be obtained. The horse

"That can plow and sow
And reap and mow,
Or to the village gayly go,
And in a race
Maintain the pace,
And win with ease and grace."

Eminent Statesmen. — General Grant proved that he was not only a statesman of marked ability, but the greatest military chieftain of his day; Washington was a man of kindred parts; Lincoln could wield an axe, steer a flat boat, write a state paper, and guide the ship of state amid the most perilous times. Each and all were men of comprehensive minds and broad, liberal views. This enabled them to do many things and do them well. They were great, because they met great responsibilities of a varied character, and served well their day and generation.

Selling Value.—When property in man was bought and sold, the selling value of each person depended somewhat upon the variety of work he could accomplish. Apply this principal to horses, and we have our most valuable type in the general-purpose horse; and as I have before stated, it is from the trotting families that he can be found in greatest perfection, for it was from the common stock of the country that the trotting horse was obtained, as the customs of the people led to the use of the carriage instead of the saddle. The trotting gait being the most graceful one for the carriage, speed at this gait soon began to be developed.

Trials of Speed.—The spirit in man that stimulates him to excel his neighbor, was not long in giving expression through the trotting horse. It has been but about fifty years since this method of testing the powers of the horse has been extensively practiced, and while it must be acknowledged by the friends of the trotting horse, that an opportunity through him has been given to the betting habit among men, and other immoral practices that the baser elements of society are ever ready to improve, yet there are many profitable lessons learned by those who have studied the methods that have been crowned with greatest success.

The Successful Jockey.—One very important lesson, is that the most successful jockey is the one who, through kindness to the horse, has gained his confidence. When this is accomplished, then every nerve and fiber of the confiding horse is subject to the will of his master, and so the driver of the fast trotter is entitled to a large share of the honor; for he must possess a trained mind, a steady nerve, quick perception, and good judgment, and these are elements that improve manhood, and which can only be possessed by persons of approximately correct habits of life.

Superiority of the Mare.—The development of speed in the trotting horse has revealed the fact that superiority is not alone possessed by the male sex of the equine race, as the names of Lady Suffolk, Flora Temple, Goldsmith Maid and Maud S. will attest. These have worn the champion's crown since 1850, most of the time yielding it only for a short time to Dexter, St. Julian, 2:11¾, Rarus and Jay-Eye-See, 2:9¾. At the present time, the record of Maud S., 2:8¾, endows her with the proud title of queen of the trotting turf. Jay-Eye-See, with his record of 2:9¾, earned the title of king of his sex. There is but one second of time to the advantage of the queen, but that is sufficient to prove that the power to lead is not always with "the sterner sex."

Origin of Trotters.—While there are nominally a large number of trotting families in the United States, yet when the subject is fully investigated, it will be found that there are three families that have produced most of our trotters, namely: Messengers, Morgans and pacers. But already I fancy the voice of Huntington is shouting, Bashaw and Clay! and to such call by him and others, I would answer, that were it not for the blood of old Messenger, through the grand-dam of Young Bashaw, the echo to the call would have been the only answer to the name of Bashaw among celebrated trotters; but when this ever potent blood has been reinforced with another rivulet from the great fountain, as in the breeding of Andrew Jackson (whose sire was Young Bashaw, and whose grand-dam was a daughter of Messenger), we come to the paternal head of the justly celebrated Clay family. As no trotters of note descended from Grand Bashaw, except through this son, Young Bashaw, it is both reasonable and just to give the honor to the family that is continually producing trotting speed. I would not detract, or belittle in any way, this great branch of the Messenger family, and in calling attention to the relationship of the Bashaws and Clays to Messenger, I believe myself to be a truer friend to the family than he who would hide this kinship by the substitution of an Arab. The rivalry and jealousies of breeders, whose minds are so narrowed by selfishness that they can see no good beyond their own barn-yard, have extolled the merits of their own branch, and pointed to defects in others with such magnifying powers that the reader of much that is written on the subject of trotting horses (were he not well posted in pedigrees) would not for a moment think that the Hambletonians, Mambrinos, Abdallahs and Clays were all branches from the same parent stalk—Messenger, the son of English Mambrino, son of Engineer, son of Sampson, son of Blaze, son of Flying Childers, son of the Darby Arabian.

Breeding Problems Solved.—The interest that has been given to this class of farm-husbandry in the last quarter century, has solved many of the breeding problems that previous to this time were clouded in mystery; but the reason for the fact that Messenger should so far excel all other thoroughbreds in the propagation of "trotting instinct" in his progeny is still unanswered, although it is acknowledged by all enlightened horsemen that he stands preeminent above all others, as the most reliable source from which to obtain winners in trotting contests. They are larger sized horses than the average thoroughbred, and being kindly dispositioned, they are rapidly supplying the place of the "gentleman's carriage horse," and at the present time there is perhaps no branch of the Messenger family that is so much sought after as the Mambrino Chiefs, to fill this demand; and while they have proved upon many a well contested field that they are dangerous rivals of the best in speed qualities, they are on an average larger than any other family of trotting horses. This is a very important consideration for the average farmer, for if you breed from representatives of this family, your chance to obtain extreme speed is just about as good as from any other source, and the prospect for obtaining a horse large enough to do any kind of work is increased by the same ratio that they are larger than other families.

Noted Trotters.—Among the noted ones of this family may be named, Lady Thorn, 2:18¼; Woodford Mambrino, 2:21½, and four other sons and daughters in the 2:30 list; besides, he has 22 sons who have 71 sons and daughters that have records below 2:30. Of this number, Mambrino Patchen has 13 and Woodford Mambrino has 11. The dams of Almont, who has 33 of his progeny in the 2:30 list, and Piedmont, whose record is 2:17¼, Administrator, 2:29½, Almont Eagle, 2:27, Allie West, 2:25, Alpha, 2:25½, Dainty, 2:26¾ Director, 2:17, Ella Clay, 2:27, and ten others whose progeny have records between 2:26½ and 2:21, are all the daughters of Mambrino Chief. These figures are obtained from the records of 1885, which are doubtless changed greatly to their advantage at the present time, as Almont alone has added six to the 2:30 class during the last three years.

The Mambrino Chiefs.—I would call especial attention to these facts, for the reason that the farmer who keeps but one span of horses should know where to improve the size of the roadster and general-purpose class, and not lose in quality in any respect that firmness of muscle, density of bone, intelligence of brain and nerves of steel, all of which are possessed by the trotting families, and which it has taken generations to establish. For this purpose, there is no branch of the Messenger family that will rank equal to the Mambrino Chiefs.

The Morgans—Occupy the other extreme, being the smallest of all families of trotting horses; but when beauty of form, soundness of constitution, docility of temper, endurance, longevity and general usefulness are taken into account, they have no superiors. It has become proverbial that any person who has once owned a typical Morgan and worn him out, is never quite satisfied with any other kind of a horse.

Celebrated Horses.—The Blackhawks, Knoxs, Marrillos, Fearnaughts Ethan Allens, Daniel Lamberts, Golddusts, Flying Clouds, Herods, Ripan Boys, and many others of but little less fame, are representatives of this family, and their records upon the trotting turf prove them to be nearly the equal of the best. In the 2:30 list are found 308 Morgans that trace in the direct male line to Justin Morgan that have trotted 2,853 heats in 2:30 and better; 2:16¼ is the fastest heat, by Lucille Golddust, that we find accredited to Morgans, but in looking over the blood lines of such celebrities as Rarus and Jay-Eye-See, we find they, too, have a dash of Morgan blood through their grand-dams. But the greatest sensation of the year among horsemen, is the announcement by Joseph Battell, that he has the evidence which proves that Old Canadian Pilot was a son of the Hawkins horse, the son of Justin Morgan. Accepting this revelation as a fact, and it is no longer a mystery (to those who know the marked intelligence of the Morgans, together with their vital stamina) why the blood of Pilot Jr. was so potent, when mingled with the hot blood of the thoroughbred; that the horse possessing these two antagonistic tendencies was so easily persuaded to abandon the gallop and stick to the trot until the last competitor was left in the rear—for it is the compound blood of Hambletonian Pilot, Jr., and the thoroughbred that courses proudly through the veins of the king and queen of the trotting turf.

Pacers.—Just where they originated I shall not attempt to tell, but in the statuary of ancient Greece is found the likeness of the pacer, and historians have occasionally referred to them as being among the horses of England in an early day. But in later times the thoroughbred overshadowed him, and he ranked as plebian while the thoroughbred was the patrician. In the early settlement of our country, however when horseback riding was the only ated, and became very common in the Eastern States, and as a result at the present time there is an admixture of his blood in the common stock of the country, and especially so in those States where horseback riding is most prevalent. So when the pedigrees of celebrated trotters began to be studied, it was so often found that in them was mingled the blood of 'the pacer, that he soon began to be tolerated as a factor in the American trotting horse; and at the present time the breeder who wishes to obtain a phenomenal trotter, will, through the light of the last quarter of a century, be careful to secure a strong infusion of the blood of the once despised plebian pacer. The pacing stallion Blue Bull ranks first as trotting-sire, having more 2:30 performers than any other horse. The two most celebrated trotters of 1886, Harry Wilkes, that defeated Phallas in a matched race, and Manzaniter, the California four-year-old, that was able to defeat the best of the age at St. Louis, in the unprecedented time of 2:15, 2:17, and 2:16¼ in three heats, are each amalgams of Hambletonian, Clay and pacer. The dams of each are pacing bred. It is claimed by some that four of the entire sons of Justin Morgan inherited pacing elements from their dams, thus making it necessary to divide the honors that have been given to Messengers and Morgans in trotting victories with the pacer—the horse that came from no one knowns where; but all are quite certain that he is going to "get there."

Profit in Breeding Roadsters.— There is a vast amount of capital invested in breeding-farms all over the country, and there is no class of farm industry that is more certain to yield a good profit than the raising of stylish, fast roadsters, and the roadster and the trotter are the same animal. Size, style, substance, speed, and fashionable breeding are the essentials that the market demands.

Success Attained.— There is, perhaps, no branch of stock raising that requires so much knowledge of nature's laws, and so great wisdom in the adaptation of means to an end, as the producing of this class of horses; but I assure you that it is possible for some to attain success that is not surpassed by any other kind of farm enterprise. I have but to present the following figures of the Glenview sale in October, 1886:

Five stallions sold for......	$63,900.00
Ninety-four brood mares sold for......	157,740.00
Forty-one colts sold for..............	67,600.00
Forty-three fillies sold for..............	53,585.00
Four geldings sold for	1,115.75
The average price for stallions was....	$12,780.00
The average price for brood mares was	1,678.08
The average price for colts was	1,500.00
The average price for fillies was.......	1,240.50
The average price for geldings was. ..	278.75

To these figures may be added $50,000 that has been offered, and refused, for some of the best individual trotters, proving conclusively that their worth is greater than any other class of horses.

The Horse for the Farmer.— But it is not expected that the average farmer will make this branch of husbandry a specialty, neither is it advisable for him to do so, as the training and developing of the horse for speed purposes is the most unpromising business that could enlist the energies of the common farmer; but this type of horses makes the very best general-purpose horse, the family carriage horse, the fleet roadster —"where time is money,"— the livery horse, and the horse that will do all kinds of farm work, when used from colthood for such purpose, with a fitness, when all the demands of the farm are considered, that is not equaled by any other class of horses. This statement is based upon the fact that he is the most highly cultured horse in the land. He is under as perfect control when at extreme speed as when walking; his enduring qualities are surpassed by none, and equaled only by the thoroughbred; in longevity he surpasses all, and being of medium size, he is graceful in motion, beautiful in form, and distinctively American.

The American Trotter.—In no other country can the equal be found of the American trotter, and the man who has a well matched pair of fashionably bred horses of this stock, of about 1,200 lbs. weight, will be able to move loads of as great weight as economy would dictate, for is there not wisdom in the old New England maxim: "Light loads and go often, whole carts and fat oxen." The inherited qualities of the trotting bred horse qualify him for so many different places that the opportunities for sale are much greater than if his capacities fitted him for one kind of work only, and especially is this true when a good medium sized mare is to be judged. Besides the observing breeder will soon find that there is much less danger of loss in rearing the young from medium sized stock, than from the over-grown families.

Breed to a Purpose.—It is important that the breeder of horses should know all that can be known of the laws of heredity, for it is by conformity with nature's laws that the "ideal horse" is to be obtained. Scientific breeding consists in uniting the strength of inherited tendencies upon one definite purpose; and rejecting all that is antagonistic—the breeder should look well to the condition of the parent, on both sides, for they can only reproduce that which they possess. So if you wish a draft horse, breed to the best representatives of sire and dam of that class, or if you want a runner whose breeding entitles you to expect a winner, breed from the running winners; but if you want a horse that will ever be the universal favorite in our country, breed to that family of trotters that possess most of the qualities you desire.

With all due respect for the Scotchman who loves his Clydesdale, the Frenchman his Norman, or the Englishman his thoroughbred, the patriotic pride and joy of the American will ever dwell with the American Trotting Roadster.

BREEDING TROTTING HORSES.

By SEYMOUR BROOKS, Walworth County, Wis.

Fourth Paper.

Like Begets Like.—There are certain essential rules to be observed in successful breeding of animals which have been formulated by experience and observation.

Those breeders who have succeeded in producing the best types of the breeds have been the deep thinkers and mos careful students of heredity. It has become an acknowledged axiom in breeding that like begets like; that the offspring will resemble the parents, or some remote ancestor, which gives the breeder a foundation on which to build.

Well Established Breeds. — We have to-day a number of well established breeds of horses that have been bred in line for a good many years, all good and well adapted for some special use. Which of all these good breeds shall engage our individual attention is a point for each breeder to decide for himself.

The Horses to Breed.—The kind of horses we like best, generally speaking will be the ones for us to breed; we will be more interested in them, and derive more pleasure and satisfaction in careing for them. It will not be irksome for us to be with them because we like them. Which of all the breeds will best do my work, and the surplus command a good price in my market? In determining this question, there are some local considerations not to be overlooked. If there is some well established breed that greatly predominates in your vicinity, that fact itself will bring purchasers for that particular kind of a horse, make a market for him right at your door, and greatly facilitate your chances of sale. If this be the case go in with your neighborhood and help to make it famous for that breed. The greater number of good horses you can group together in one neighborhood, the sharper will be the competition for them. It will call buyers from a distance, knowing the fact that they can be obtained by the carload. Another factor will be that a choice of stallions will be kept there, making it more convenient in breeding your mares to your special kind of horse. Other things being equal, I believe a man had better breed the horses he likes best. He will derive more pleasure from his favorites and make a more skilful breeder, if he follows the bent of his inclination. We are made up that way, and we can't help it.

The American Trotter.—If there are any gentlemen present who have not fully decided what kind of a horse to breed, and are waiting for more light on the subject, allow me to put in my plea for my favorite, which is the American trotting horse. In so doing, I do not antagonize any other breed; nor am I here to champion any particular family of trotting blood. A combination of Hambletonian, Mambrino Chief, the Clays and Morgans, so intermingled as to produce a horse that will weigh twelve or thirteen hundred pounds, is my ideal of a horse—one that I have thought much about, and labored many years to produce, with what success you will learn farther on. Do not get the idea that I am going to champion the track horse, and advise farmers to breed him. I leave that part of the subject for Mr. McKinney, who will, no doubt, do it justice. It is the larger part of the breed to which I wish to call your attention—horses that have plenty of bone and muscle to do any farm work with ease; that have the courage not to be outdone in a hard day's work on the farm, or a long drive on the road; that have the brain that is susceptible of being educated into a companion for man, his most willing and faithful servant, the peer of all animal creation, the best gift of a divine father to his children. I do not wonder the Arab loved best, next to his creator, his favorite horse.

Breeding the Dam.— How shall we breed this kind of a horse? If we build on a sure foundation, we must make the dam the chief corner-stone. A mistake here is fatal to the whole building. Any defect in the material used in the foundation lessens the value of the whole building. You may use the best material in the upper stories, still the building will be defective. So, also, if there is any defect in the dam, a lack of size or color, a bad disposition, any weakness of bone or tendons, want of a vigorous constitution, in short, any defect, it condems her as a foundation on which to rear an ideal horse. If her disposition is bad, reject her, for her progeny will be like her. The dam gives the temperament, the sire the conformation. When you find one all right in conformation, disposition, size and breeding, do not let a few dollars stand in the way of your being the owner of her. If she is a regular breeder, she will pay you better than a government bond worth one thousand dollars. I say this from my own experience. Having obtained her, consider her too much of a treasure to part with.

Breeding the Sire.— We are now ready to go to horse breeding on the dam's side. What kind of a sire is fit to mate with this mare? I will first name some I would not use, and then describe one I would. I would not use a small, fine-boned horse, although he had the speed of a Patron or a Harry Wilkes. There are too many blanks in breeding expressly for speed. Leave that to those breeders who can afford to take the chances. If we breed a small horse, and he fails to go fast, his market value will be diminished in proportion to his size. In breeding for large horses, enough of them will be small to supply the market for small horses. Let us aim to breed horses that will tip the beam at 1200 lbs,; sixty-four inches high, with heavy flowing mane and tail, which is an ornament to the carriage horse that will be appreciated by the purchaser. A pair of carriage horses that is deficient in this respect will not sell for a large price Do not breed to a horse with pig's eyes sunk into his head, and narrow between them. He will lack intelligence—a stupid brute. Avoid dull color, rough coat, small, shelly feet. "No foot, no horse."

My Ideal Stallion—Is a horse that will weigh from twelve to thirteen hundred pounds; bay brown or black; bright, soft coated, indicative of thrift; large brilliant eye that looks clever, and intel ligent; strong muscular development; back short and slightly arched; rump long and level; round barrel; sprung ribs; fullness of chest; resolute head; long, oblique shoulders; heavy arms and thighs; strong, bony limbs; great length from hip to hock, short from hock to pastern; black, round feet—one whose ancestors down both sides were like him, bred in line with no out-crosses from trotting families. We will breed our mare to such a horse, believing we have started right in breeding on a good foundation, with an expectation of success.

I would have the dam perform some kind of service while carrying the foal, and feed one part bran, three parts oats. These phosphates will furnish, through the dam, bone and muscle forming food. Wean the colt at five months old.

Raising the Colt.—If you have good pasture, water and shade, that is sufficient. If not, supplement with wheat bran and oats, half and half. Arrange the feed box so that the colt can eat with his dam. At weaning time, tie the mare in a box stall; put a halter on the colt and tie him by her side. That will be satisfactory to both of them. Let loose the colt three times a day, to nurse, for a few days. Do not give the dam much water; it will help to dry her milk. Keep a pail of water before the colt, also bran and oats. In about four days take the mare away and put her to work. Our colt should now be in good flesh. Let us aim to keep him so. It can be done with feed. Different colts will need different amounts. Do not be afraid of feeding too much; it will not hurt him. American Eclipse was fed six quarts of oats the first winter, and it did not hurt him. Do not get the idea that because you are feeding the colt all the hay he can eat, you are doing for him all you can. A colt's stomach is small and does not need much hay. What he wants is concentrated food, rich in phosphates, to build up the bones and tendons. Oats and wheat bran contain the elements needed, with a little hay to distend the bowels. Give him liberty, in a small yard, during the day.

Educating the Colt.—When the colt arises, go up to him, put your left hand under his neck, your right hand around his hips. Hold him still; he will be afraid and struggle some, but you can hold him. He will soon quit struggling and look at you. Pat and rub him; he will like it. Keep hold of him until all fear is gone; then let him loose and he will probably follow you. Do this several times a day for a few days, and he will expect to be fondled when you come, and pleasant relations will be established between you. Have a little lump of sugar in your pocket for him; he will like it and come to you for his sugar. Pick up his fore feet, rub and pat him (do not forget the sugar).

We left him tied in the box stall. What are we going to do next? I should go in there alone, taking a rope along with me about 20 feet long. Now, find the middle of it, and put the loop end over his hips, down in the curve of the stifle. Tie a knot where the neck sets on the shoulder; put each end on either side of his neck and both ends through the ring of his halter. Untie him and lead him out, which you can do about as well as you did his mother. He will not pull back much; neither can he rear up and fall over backwards, as they do sometimes, striking their heads on the ground, which is very dangerous. Give him a couple of lessons in this way; then tie one end of the cord around his neck, put a loop in his mouth and you have perfect control of him. Stand a little way from him and tell him to come. Of course he does not know what it means. Twitch the rope a little. It hurts, and he will come up to you. Step off again and repeat, and you will teach him very soon to come by the word without pulling on the cord. One thing more should be taught him while the rope is in his mouth; the most important point in colt breaking, and which needs to be followed up to horse-hood—the word whoa. Give him to understand that when he hears that word it means implicit obedience. Speak the word; at tbe same time give him a twitch on the rope. Repeat until he minds the word-without the cord. This preliminary work faithfully done, harnessing and and driving will be mere pastime. My excuse for consuming so much time in colt breaking is that a high spirited colt spoiled by education becomes a worthless brute, and the fault lies at the door of the teacher.

When to Sell.—Any time you are offered a good price. Do not wait to get the last dollar in them. Give the buyer a chance to make something on them.

Where to Market.—At home; the buyers will look you up. Sell one to your doctor, if you live some distance from town, so that he can get to you at a lively gait if occasion requires; it will be a walking advertisement. Sell one to your minister; it will make him a better preacher. When Henry Ward Beecher wanted to draw on his intellect to its fullest extent, he used to take a drive with Mr. Bonner, behind his fliers. That gave him the inspiration. When business or pleasure calls you on the road, harness them tastefully, and if the road will permit let them step along at a lively gait. They will enjoy it, and so will you. If there be a piece of smooth road, cut them loose for a half mile or so. You will be too busy holding them level to notice a second party as much interested as you are, and there will be some talking in town that night which concerns your horses, and buyers will come around, providing you have the goods they are looking for. Do not be too greedy in price; give the middle-man a chance to make something. If you are dealing with a party who wants them for his own use, you can add the price of the middle-man's profits.

Will it Pay.—I know of no better way of turning hay, oats and grass into money. Previous to the year 1883, a good flock of sheep paid me the best. Since then my horses have come to the front. I breed Durham cattle, Merino sheep and the kind of horses I have tried to describe. My income is derived from this source. While I have not become a bloated bond-holder, yet with the help of these animals, and a kind providence, I have bucked the mortgage off the farm. I am well satisfied with the results of my horse breeding; they have paid well in dollars and cents, and I have derived a great deal of pleasure and satisfaction in watching their development. In breeding this kind of a horse, you are liable to get speed enough in some of them to make them command a long price. Sell those (if not your best fillies), for they are dangerous property for the average man to own· They are apt to turn his head and spoil the boys. Be satisfied to breed them; let the other fellow sport with them. They will all be good road horses. Good farm horses will fill more places well than any other breed that I know of. While I have not been breeding for speed, considerable has cropped out. I bred St. Albans, with a record of 2:20¼, Western Boy, 2:26, and a good many that could beat three minutes. The first two named were large enough to draw a reaper or a heavy family carriage, but their gait was so rapid that they were promoted from a Wisconsin farm to draw the family carrige of a New York City millioniare at a cost of $4,000. I did not get that, but I got all I asked, and ought to be satisfied.

Recapitulation.— Breed only from large, sound, well formed mares, good color and disposition. Breed in line from standard-bred stallions. Keep in mind the laws of heredity; remember, the colt generally takes its disposition from the dam, the conformation from the sire. Use a sire that has size, form, substance and breeding. If he is a fast, gamy trotter, so much the better; it shows strength, will and constitution. Feed the colts bone and muscle-forming food in sufficient quantity to keep them growing; never let them go backwards or stand still. Last but not least, carefully educate them; this will not be done unless the groom has some good horse sense. Be mild, gentle, yet firm. Speak to them in a low tone; they are quick to hear, and will try to please you when they know what you want. Exercise at least as much patience with them as you would with a dull boy, and they will be just as apt scholars. Reward them for good behavior by patting them and calling them good fellows. Remember they have got a will of their own; do not try to break it. Your business is to turn it in the right direction; teach them to use it in finding the end of the road, in disdaining to travel in the other horses' dust. Utilized in this way, it becomes a cardinal virtue. Turned in the wrong direction, it becomes an unmitigated vice.

THE CONFORMATION OF THE HORSE.

By V. T. ATKINSON, V. S., Milwaukee, Wis.

Fifth Paper.

The Perfect Horse.—When first asked to address this audience by Supt. Morrison, I supposed that I was intended to do something of the same kind of work that we are doing at the institutes. He asked me to give a talk on the conformation of the horse, and to illustrate it by the use of this model. Now, I find there are a good many people who have come here more to see the model than to hear me talk. Perhaps it will be well to consider the conformation of a perfect horse. The horse that I will outline may not be your ideal horse. We differ in our tastes on horses as much as on other things. I will just run over the outline of a perfect horse, according to my idea. Of course, proportion and graceful outline go for a good deal.

Points.—In looking for an animal approaching perfection, we expect to find the head not too large in proportion, the forehead broad and flat. The brain is situated in the cavity beneath, and the space between the eyes is indicative of storeroom above—the position which the brain occupies. The eye is lively and full of fire, the face straight, the nostril wide, the lips thin, the ear firm. The muscles on the sides of the cheek are well developed; these are the engines that carry on the first process of digestion—mastication; they are the grinding stones that crush the food. Running back, the neck should be curved above, straight on the line below, widening gradually toward the body, and not too full toward the head. We find, sometimes, necks looking as if they were put on wrong side up; what we call a yoe-necked animal, not a pretty thing. Then we find the opposite of that, what we call a bull-neck, anything but beautiful. Passing backward, the front legs should run in a straight line down from the body; the two feet should approach each other slightly, looked at from in front. The shoulder should suit the purpose for which the animal is intended. If for speed it should be flat. If for draft it should be upright. The front legs are the carrying power of the animal. They are the parts on which the animal's weight rests mainly, while the hind legs force the animal forward over the ground. The feet should be a little nearer the center of gravity. Looking at the leg sidewise, the arm below should be long in proportion to the parts below the knee, the whole limb descending in a straight line from the shoulder.

A low down knee is desirable in a horse, enabling the animal to make a long stride more quickly than when the knee is set high up. Speaking in general, a rough joint, as a rule, is a good joint, not one that is smooth where the interstices between the bones are filled in by what we call false tissues, that which is called a gummy joint. The knee and fetlock should be large, broad in front and distinctly marked with bony prominences. The fetlock should slant to an angle of about 45 degrees, running down to the hoof.

The foot on its ground surface should be round, and in size proportionate to its owner. The line of the front wall should be parallel to the centre of the pastern and at an angle of about 45 degrees with the sole.

In considering the body, see to it that there is room enough for the lungs and digestive apparatus.

The breast should be prominent. The ribs should stand out with sufficient curve to afford space enough within. The back should be straight and not too long; the loins wide and flanks full. The tail should be set on at the right place, for it is impossible to have a good appearing horse unless he have two good ends. The hips and quarters should be well muscled and strong. The stifles should project boldly forward and have a perceptible irregularity of surface. The thigh should be muscular, thick and proportionately long; the hock wide from before backwards; rough and prominent. Its front should stand straight backwards, and when viewed from the side it should not have too much curve.

Appreciating the shortness of the

time allotted to this talk, I have run over these points very rapidly. In order that what I have said may be fully understood, I will now make a rapid dissection of this model which is the one used to illustrate the course in veterinary science at the university. It can be so detached and arranged as to show over three thousand anatomical parts. (The doctor then dissected the model completely and briefly explained each part.) If there is anything farther you desire to know, please ask questions.

Discussion.

Mr. Sloan.—Doctor, I have seen it stated somewhere that the cannon bone of the draft horse is light and porous, while the cannon bone of the thoroughbred is like steel. Has any actual scientific investigation been made by the microscope or otherwise, so that we can know whether there is any difference in the composition of the bones of the leg of the thoroughbred horse and the draft horse?

Dr. Atkinson.—Nature has arranged that the different bones shall be made to suit the peculiar requirements of the animal. The bone is made up of two different styles of tissues. There is the compact or denser element, and the cancellated. If you make a section of the cannon bone of a deer, then make a section of the cannon bone of an elephant, you will find a great difference in the structure of the two bones. You find on the deer's leg a very heavy layer of hard tissue on the outside, and the softer structure much less in proportion. In the elephant you find only a trace of the compact tissue. If you will take a cross section of the leg of a race horse that has been bred continually so for many years, and then a similar section of the leg of a heavy draft horse, you will find the same kind of tissue in each but a larger amount of cancellated or soft tissue in the larger horse's bone than in the small one's, while the smaller bone would be likely to have more of the compact or hard tissue.

Mr. Urquhart.—I have not noticed in the paper what this gentleman speaks of, and also they claim that the feeding makes the difference. The draft horse being fed corn, it didn't have a tendency to make the muscles of a race horse. I would like to know about that.

Dr. Atkinson.— Prof. Henry could answer you on that subject more ably than I. Of course, the animal is influenced by all the surrounding influences, and has inherited some peculiar attributes. Exactly how much can be done by feeding has not yet been demonstrated. I think there is no person to-day, who knows much more about feeding than Prof. Henry does.

Prof. Henry.— Mr. Chairman, within a week, assisted by Dr. Atkinson and Mr. Theodore Louis and our short course class of students, we weighed the bones of animals fed differently, and I would say that the thigh bones of a pig fed exclusively corn, stood a strain of 170 lbs. pressure, in order to crush it, for each 100 lbs. weight, while that of a hog fed upon shorts stood 270 lbs. pressure, a difference of over fifty per cent., and that difference was brought about by feeding exclusively corn for ninety-eight days in one case, and shorts and corn in the other. We have repeated it again and again and always come out the same way, and I think it is fair to infer that the feed did make the difference.

Gen. Parkinson.—Doctor, I would like you to explain to this audience with your model, what is curb, and what produces it.

Dr. Atkinson.—The ligament at the back part of the hock is likely to be strained. When an animal is subjected to a severe strain, or in attempting to make a long leap, or is thrown violently back upon its haunches, a great deal of stress is thrown there, and this ligament is liable to strain or partial rupture of some of its fibres. When that occurs it is followed by swelling, inflammation and tenderness. It is liable to recur if the joint is of faulty construction. Generally when it first occurs, it can be gotten rid of, but if it returns it is more difficult to get rid of.

MR. STRUPE.—Can it be made as strong?

DR. ATKINSON.—That depends upon the shape of the hock. As a rule it is not possible to make a joint stronger than it was in its first natural condition.

MR. PHILLIPS.—We lost in our section a very valuable horse, and the cause given was this: He had been fed concentrated food, oats, etc., through the early part of the season; in the after part of the season they let him eat all the clover he could, which distended his stomach to such an extent that it caused his death. Now, it is important for the farmers to know if a change of food can have that effect. One veterinary surgeon said he had eaten so much that it burst his stomach; another said that when he fell it burst his stomach. Please give us a little light.

DR. ATKINSON.—You can understand why I should hesitate to criticise the opinion of another veterinary surgeon. Of course, sudden, violent changes are always objectionable. Rupture of the stomach does sometimes occur; the stomach of a horse is very small.

MR. URQUHART.—I want to ask about the hoof of the horse. Do you think it is necessary to keep the frog in a healthy growing state, to keep the foot from contracting?

DR. ATKINSON.—The foot is complete as nature made it, and adapted exactly the conditions in which nature placed the animal; that is, the foot will grow just about rapidly enough to keep in a healthy condition when the animal is running on pasture, when the foot is wet every morning by the dew on the grass and when the animal goes to drink. The frog is as essential to the well being of the foot as any other part. When you place an animal on what we call good roads, good as far as the rider is concerned, but not so far as the foot is concerned, if you neglect the frog or allow it to contract, it will press in on the soft part of the foot, pressing in on the cartilages, and injure the little arteries so that free blood passes down through the sole and forms what is called a corn.

The frog should be cared for in some way; exactly in what way depends on the surrounding circumstances. I have seen draft horses that couldn't stand up without their shoes on. The frog had been neglected so long and would grow so full, that if you took the shoes off the whole weight would be thrown on the frog and the pain would be so great that he would not stand.

QUESTION.—Do you think it wise to have the shoe bear on all parts of the horse's foot, or would you spring the heels?

DR. ATKINSON.—In preparing the hoof for the shoe, it should be made perfectly level. Then the shoe should be made to fit the foot, and be allowed to press equally on all parts. If you attempt to spring it up, in springing back, by striking, it is apt to do more harm than good

MR. FISH.—Do you consider the general practice of trimming the frog by horse-shoers, detrimental or dangerous?

DR. ATKINSON.—I must answer that again by saying that it depends largely upon the condition of the frog. If the frog is healthy and soft, let it alone; if it is unhealthy, of course you must trim it. As a rule, the foot should be prepared, made perfectly level on its lower surface, then the sole cleaned out, and all the dead parts of the hoof taken from it. After you have gone through the dead part, don't take any more. You should not cut it down until you can put your thumb on and feel it spring under it. It is too thin when it is that far along. The frog, if it is healthy, should simply be cleaned off on the outside.

MR. BROWN.—What would be the effect of a hot shoe?

DR. ATKINSON.—The first requisite is that the shoe should be made to fit the foot, not the foot to fit the shoe, and it should bear equally on all parts of the foot. If the horse-shoer, in order to make a perfect fit, heats his shoe and applies it just until it smokes, and then trims off until it will fit, it is not objectionable. There is another way, but I never knew of a horse-shoer that would do it. If he would put his shoe into a box of chalk and then put it on, he could see just as well as if he burns it on. If he allows that hot shoe to remain on until the animal flinches, he has done a great deal of harm. The heat should not be permitted near the delicate tissues above. If it is, it is liable to be followed by the conditions of any burn. You are liable to have the whole sole sluff off.

MR. BENDER.—Can you tell us about the disease known as ring-bone?

DR. ATKINSON.—The middle joint of the pastern is generally the seat of the ring-bone. First it is simply an inflammation of the joint; then a deposit of bone is thrown out, and if that condition continues, the two bones unite into one. After the bone has begun to form into a ring-bone, the animal never can be cured, that is, restored to its former condition, but the other joint can perform the work if the union of the two bones which constituue the diseased joint be complete so that the joint is obliterated.

MR. LOCKWOOD.—Isn't it better for the general farm horse not to be shod at all?

DR. ATKINSON.—Well, the experience of all people, of all times, has been that the horse should be shod. There are conditions under which the ordinary farm horse may be kept without shoes, but if they are going to be used at all on the road, you are liable to have trouble. The structure of the foot won't grow rapidly enough to compensate for the wear of common use.

QUESTION.—We want to know about "founder" of the horse.

DR. ATKINSON.—This desease is perhaps the most painful one that a horse is heir tò, and generally results either from chill or over-exertion. It attacks what we call the sensitive laminæ—the structure by which the sensitive and insensitive parts of the foot are united—and they become inflamed, and it is as if there were an acute inflamation and something put on and pressed against it. The peculiar position which the animal takes in traveling has led to error. The animal tries to get the weight off the laminæ as much as possible. If he can get his weight back on his heels, he will get some relief, and in endeavoring to do that he keeps his feet well out in front of him—so far in front that he has the appearance of having a sunken chest. The shoulders are thrown forward on the side of the chest and the feet away out. There is no disease of the chest in the disease called founder.

QUESTION.—What means would you propose to help that disease?

DR. ATKINSON.—The inflammation must be allayed. There is quite a long course of treatment. The simplest one is what is lately known as the American, and is to give the animal half an ounce of saltpetre, nitrate of potash, every three hours until he gets relief. I do not think bleeding of the toe should be practiced until diffusion of the blood is likely to take place. The foot should be kept cooled as much as possible by the application of cold water. If the inflammation is continued three or four days you are liable to have effusion take place betwe̊en the sensitive and unsensitive laminæ, and separation of these parts.

PROF. HENRY.—I see there are many here who would like to know more on these subjects, and I suggest these farmers send their boys up next winter to hear Dr. Atkinson talk about them.

DAIRY SESSION—MARCH 29.

WHAT COW DOES THE DAIRYMAN NEED?

By Hon. W. D. HOARD, Ft. Atkinson, Wis.

First Paper.

H. C. ADAMS in the Chair.

Two Types of Cattle.—I am restricted to twenty minutes, and the cow is over six thousand years long. To condense this question into so short a statement, is a work which I shall be unable to accomplish; therefore, I will jump into the middle of it at once: Behind me you see hung two crayon sketches of two distinctive characters of cattle—on the left the Jersey cow Matilda 4th, that has made in one year more than her weight in butter, or over nine hundred pounds; on the right, a Hereford cow. Both are drawn from photographs.

Form Everything to Purpose.—Now, the question comes practically to the farmer and the dairyman, seeing these two machines, and observing differences of shape, why is it that with universal agreement, one machine takes one shape and the other machine takes the other shape? It may be answered, "why is it that a sewing machine is different from a reaping machine or a threshing machine? I repeated to you last night the remark of El Hassen about the horse, that "form is everything to purpose;" and if I could get the farmers of Wisconsin to indelibly burn that simple statement into their minds, I would put in their possession the key to all their future success in the handling of farm animals.

Temperament.—I base, in my studies, the dairy function in cattle upon temperament, and temperament produces form. I stand before you to-day a man of nervous-bilious temperament, and men of my temperament almost universally are of like form and characteristics.

Another man stands before you with a short neck, short, thick fingers, heavy jowl, and fleshy build and he is the product of the lymphatic temperament. Now, temperament shapes form, and form shapes function. The race horse in horses, the fine wool sheep in sheep, the hunting dog in dogs, and the dairy cow in cattle, are the products essentially of the nervous temperament.

The bull-dog in dogs, the draft horse in horses, and the beef animal in cattle are essentially the product of the lymphatic temperament. So you see that by first going back physiologically to the beginning of things, and taking temperament to build upon, you have a start by which you can determine the reason why function swings one way or the other. Then, carry that out right practically a little farther, and you will see that if you breed for the dairy you must breed to temperament, if you breed for beef, you must breed to temperament, if you breed for draft, you must breed to temperament, and if you breed for speed, you must breed to temperament. Consequently, the man who would cross the animal of one temperament with an animal of another, would simply be making hash of temperaments, cutting them up, putting two warring temperaments together, and he would have no results, or, at best, contradicting results of function in the animal. Why not go back and reason in these things physiologically?

Laws of Heredity.—The mischief with our farmers is this: They have no clear understanding of the laws of heredity. I heard a man stand up in an institute and say he commenced with Shropshires, then crossed to Merinoes and then back to something else, and he said: "I haven't a sheep worth a continental." He made hash.

Heredity is the line of descent in the parents. People look at their children and wonder why they are so much unlike themselves. They are not the only parents of the child, they are the last parents; that is all. The child has thousands of parents, and it is the antecedent parentage of the child that marks its character a thousand times more than the last parentage. This we call heredity.

A few men have been intelligent enough in this world to adhere strictly and closely in a physiological sense to the laws of heredity. Think for a moment of the value and power of heredity. Take it in dogs. Here stands a fox hound, the product of one heredity; here stands a bird dog, the product of another heredity; each dog is bred essentially for a certain power, to run and smell. The bird dog, with a nose as sharp as the fox hound's, will cross a dozen fox tracks and never know it, because his heredity is not in that line, and his discernments do not answer to that purpose; but the moment he strikes a bird's track, every single muscle in him is stiffened, and you see the whole answer of the hundred years of breeding in the attitude of that dog. The fox hound crosses a dozen bird tracks and never knows it. The moment he strikes a fox track, up goes his nose and out comes the deep mouthed assertion: "I have found it, I have found it." Found what, Mr. Fox-hound? "Found that for which I was bred to find."

Is there a boy in Dane County to-day foolish enough to go hunting birds with a bull-dog? No, but his daddy will hunt for butter with a beef animal.

When we, as farmers dealing with these animals, refuse to be wise, and fructify our intellect with this knowledge and judgment, then we stand in our own light, and deserve nothing better than what many of us get. We all need the light that comes from thinking and from knowledge.

Physiological Law of Form.—I will spend a few moments in giving you what, in my judgment, is a distinctive physiological law of form, and try and give you a physiological answer for every point that I believe applies to the dairy cow.

Beef and Dairy Forms.—You discover the difference in outline between these two animals. Here is a square block, or a parallelogram, with legs at each corner. This is the beef form. Remember at the start that this other animal is a mother, and clear down through the whole of your reasoning and studying, above any breeding, feeding or handling, must this one question of motherhood stand with the hand on the throttle all the time. She is the type of bovine motherhood. The beef cow is the type of the miser. The dairy cow takes food and gives off lavishly and liberally each day, another form and amount of food. The beef cow takes the food and stores it up and refuses to surrender it until placed on the block. For this purpose we have this form, and for the dairy purpose this other form, and these questions of form generally lie at the bottom of functional performance.

The Motherhood Type.—Now, the motherhood type is almost universally formed and built in the nervous type of character; large expression of motherhood function comes from that form of build. On the beef side of the house, we have a bullock of the feminine gender, and consequently this animal surrenders motherhood in the breeding of her young and breeds for the bullock type.

The General-Purpose Cow.—She cannot help the issue, and if the dairymen of to-day who are clamoring for a general-purpose cow would stop and think what a general-purpose cow is, they would see that such a cow must be bred from beef lines to get size, and size means extra cost for the support of the frame that they don't want, in order to get a little milk that they do want. Therefore, it is not an economical build.

The Nervous Temperament.—The nervous temperament invariably produces, I said to you, a certain form of construction. What do I mean by nervous temperament. Men and animals are divided, men particularly, into nervous lymphatic, bilious and sanguine, four basic temperaments. Then, we have the combinations, nervous-bilious, nervo-lymphatic and so on.

But with animals we are building for specific results, reaching into the future all the time, not building for to-day or for the present.

Take myself, for instance. I am a man of nervous-bilious temperament—I don't mean nerveless. People misunderstand this word "nervous." They think it means excitable, fearful, timid; nothing of the kind. See how you contradict it yourself when you say a man is a man of nerve. Do you mean he is nervous in your sense; you mean a man who has nervous power sufficient to control his nerves, not muscular power, because the nervous system lies at the bottom of all systems in physiology.

You can't fatten a man like me, and it is just the same with this cow. By virtue of temperament, food must be expended in certain lines of force, not in accumulations of flesh.

The nervous temperament in dairy cattle starts in the brain; the brain is the seat of all temperaments, but particularly is it the seat of the nervous temperament. Therefore, the brain and facial outline, the neck outline, the middle piece outline, all of these are important as indications.

Points of the Dairy Cow—Muzzle.—The dairy cow should have a wide muzzle, because she is a large eater. She must have a wide nostril because she must be a large breather; the lungs have a great deal to do with the purification of the blood, the maintaining of the character of the blood, and milk is a product of blood.

It is claimed, that if you were blindfolded and given a drink of warm milk, and another of warm blood, you couldn't tell the difference, and whether that be true or not, milk is essentially a secretion from the blood, and the breathing power has a vast deal to do with the vital character of the blood.

The Nostrils—Should be wide, the

jowl strong and muscular, but lean and free from all indications of superfluous flesh.

The Eyes—Should be very full and intelligent and active, of a quick and lively expression. The eye is an unfailing indication of the temperamental character of the brain, and should be bright, indicative of quick comprehension, standing out very full so as to make a dishing expression to the face.

The Brain— Should indicate fullness. So you see that you have here a very delicate piece of work, and those of you who think that you can take this delicate machinery and saw off the horns and expose the inner chambers of the skull and not injure this nervous temperament, had better go slow. You may deal that way with your beef animal, but not with my dairy cattle.

The Neck — Should be thin, muscular. The spine is a continuation of the brain, and should rise full from the head. It is a good sign to see it extend above the shoulder blade.

The Back-Bone — Should continue strong, full and rugged, indicating unusual strength and size of process. The hips should be full and wide, long from the hip to the point of the rump. When we come to this point we commence the study of the maternal machinery, the office for which the cow was built. You must remember that you make merchandise of her maternity, of her motherhood. Treat her like a steer if you dare, and your pocket tells the story.

The Pelvic Arch.— Here we have the pelvic arch. This is a very excellent sign in a cow. It indicates strength of the pelvic organs, wherein lie the offices of maternity; it also indicates a very strong, full rise of the spine.

The middle piece should be very large and very full, indicating large power of digestion. The ribs of the dairy cow are wide, and the space between should be wide; the ribs of the beef cow are much closer set, and the rib springs out horizontally in order to form a place to lay a loin. The dairy cow should not be handicapped with extra weight, or superfluous flesh.

The Butter Gland.— Right here at the flank is a little combination of muscles, called by some the butter gland; it rolls under your finger like a lead pencil, and, as a rule, you will always find it in excellent dairy cows, and particularly in good butter cows.

The Flank and Tail.— In a good dairy cow, the flank should be thin. In a beef animal it should be thick and heavy. In the dairy cow, the tail should be long, indicating a full, strong, spinal construction clear through, and that indicates a powerful nervous organization.

The Udder.—The mamary gland, or the udder. should have good shape, high behind, reaching well forward upon the abdomen. The cow, Mary Anne of St. Lambert has the most marvellous udder I ever saw upon a cow. She is thirty-three inches in the medial line of the udder and twenty-four inches is a good long line in any cow. A good udder should be not meaty and thick, because then it is inclined to garget. The inner formation of the udder of a butter cow is very elaborate, and the more solids there are in the milk the more danger there is of garget, and the more wisdom and care you must exercise. That is the reason the Jersey is more liable to garget than other cows.

Constitution.—A cow must have constitution, but she should not be hardy, in the sense that I hear people talking about a hardy cow. I often think how little they understand the significance of the word.

A cow must not be hardy in the sense

men talk of it, but she must have constitution. The bookkeeper must have constitution to stand the confinement of his life, but he need not be hardy in the sense of bearing exposure. Constitution is endurance in a given line of action. I may not have half the endurance that John Sullivan has to stand up and be knocked down, and still I might excel John Sullivan twice over in sitting at the desk.

You must not call upon the dairy cow to be hardy in the sense of bearing your neglect. She is a mother, and as a mother you must treat her with motherly conditions. What are they? Warmth, the first thing. A dairy cow cannot secret milk if you force her to be chilled.

Formation of the Navel.—The best indication of constitution that I know of is the formation of the navel. I ask every farmer here to go home and look his herd over and find me a single cow of large performance that does not show a very strong full developement at the umbilical or navel point. A strong conformation here means constitution, vitality, power of endurance, within the line of heredity and her natural functions. Constitution cannot be trained into a man, neither can it be fed into him; it must be born into him. Therefore, it is that which you take from your mother.

My attention was first called to this by seeing a regular army surgeon reject men for the army. I saw him turn off men who were strong shouldered, heavy lunged, straight limbed, perfect looking men, and I was astonished and I said, "Doctor, what is your reasoning?" and he showed me the weakness of this man's construction at the abdomen and said: "That man has no endurance or vitality; the moment you put him into army service, he will go down." He told me also that he had carried this theory farther in a study of animals, horses particularly. I took it up in connection with a study of the cow, and for fifteen years, whenever I have seen a cow of large performance, I have looked to this point and I have failed to find a single instance in which a large performing cow did not show well at this point. This is the channel through which support comes to the offspring, and if the off spring is largely supported, they show a full conformation.

The Nervous Theory.—Now, gentlemen, I want to call your attention in confirmation of this nervous theory to the udder, and I am done. The mammary gland is a complete net-work of cells and nerves. A marvellous combination of nerves surround this whole udder as a net-work, which is called the sympathetic plexus. From that this nervous system proceeds directly to the uterus and from the uterus to the lumbar region of the spine, and from the spine to the brain, and here is the combination, a current that governs this milk function. Milk fever sets in, starting with a chill; it is a nervous disease. These nerves telegraph to this great secretory organ, "stop work," and the disease commences to spread, passes along the sympathetic plexus until it strikes the spinal marrow, and the cow drops, the spinal column being involved. Now, it begins to show its effect as it approaches the citadel of life, and by and by it strikes the brain; she swings her head from side to side and dies a victim to her own maternity, and thousands of times to men's ignorance and stupidity.

If you understand clearly this physiological action of the nerves in the production of milk, would you treat the cow as a mother, or would you treat her brutally? Would you give her cold ice-water to drink when any intelligent understanding of the function of motherhood knows to the contrary? Would you give her cold barns to live in; would you give her food calculated to produce a flow of milk, or would you feed her like a bullock?

These are questions that come out of an intelligent understanding of the dairy cow, and the kind of a cow a dairyman should have.

MONEY RETURNS FOR FOOD CONSUMED.

By CHAS. R. BEACH, Whitewater Wis.

Second Paper.

The Subject Important.—I am expected to confine myself exclusively to the feeding of dairy cows, and to tell how to feed a cow so as to get the most money, not out of the cow but out of the food.

This distinction is a very important one, and one that is often overlooked, especially by those who are ambitious to report large yields per cow. Many of our largest reported yields of butter show an increased cost per pound out of all proportion to the extra amount produced.

Its Difficulties.—Were the cow an inanimate machine, constructed upon known and well understood scientific principles, in no way effected by external surroundings, whose capabilities of working up raw materials was always and invariably in the exact proportion to the force applied—and that force something distinct, and outside of what was to be produced—it would be comparatively an easy matter to tell with aproximate certainty how much milk, or butter, or cheese, or money, you could get by feeding a ton of hay, or corn, or oats, or bran when alone, and also how to combine them for the best results; for knowing the chemical ingredients in the article we wished to produce—and also of the materials from which we were to obtain them—we could determine the exact combinations of the different materials that would give the largest per cent. of production.

But when we find this machine that we are compelled to use, is a piece of living mechanism, more complicated than any steam engine—self acting—with inherited powers and tendencies, which can only be aproximately estimated after a full knowledge of its ancestrial antecedants, and individual peculiarities, subject to a hundred external as well as internal influences, many of them entirely beyond our control, we realize the hopelessness of attempting to predict beforehand the amount of production from a given amount of material.

But farther, when we come to know that the force by which this living machine acts must be supplied out of the materials from which we expect our products, the problem becomes still more intricate.

Cows as Conservers of Force.—Yet with all these apparent disadvantages, we may congratulate ourselves upon the fact that the cow, as a conserver of force, is vastly superior to any mere mechanical contrivance yet invented. In the most perfectly constructed steam engine now in use, not more than ten per cent. of the energy of the heat in the coal is utilized in making steam. And further it is claimed that less than four per cent. of the heat imparted to the steam in an ordinary locomotive boiler is utilized in the performance of labor on the engine, 96 per cent. being thrown away and lost in the exhaust steam.

Returns.—The cow, on the other hand, even with our imperfect knowledge of how to feed her, gives us back in products something like ⅓ of the materials furnished in the food; and the remaining ⅔ which she uses to supply the wastes of her own system, she returns, all that is of value, in manure, by which the fertility of our lands is maintained

If in the economy of nature, our live stock were able to give back all the materials in the food, in the form of pro ducts, the earth in time would become an unproductive waste, incapable of maintaining animal life or vegetable growth.

But if to the part she returns to us, she has given an additional value, making it worth more than the whole raw material, the more she returns to the soil the better.

How to Feed.—But what have we learned, and what do we know about how to feed cows so as to make money above the cost of the food we give them? That there is difference in cows, and the kind we must have from which to make the most money, must be one with both those inherited and acquired tendencies that best qualify her to convert her food into milk of the required standard.

Requisites.—She must be in good health, a good eater, and have good digestion; must be not less than four years old, nor more than nine; easy milker, and of a kind and gentle disposition; not above the medium size, and thoroughly feminine in her organization. She must be surrounded with those conditions that most conduce to her comfort. The more comfortable or perhaps I had better say the less uncomfortable she is, the greater probability of her making paying returns for food consumed (we all know how a cold rain in spring or fall will shrink the yield of milk). She should have an abundant supply of hard water, and should be salted every day or every other day.

Milking.—She should be milked by the same person at regular hours that should divide the day into two equal parts, as near as convenient, and when one person milks several cows they should be milked in regular order.

It should be so arranged that the largest flow of milk should be during that part of the year when dairy products are highest, which will be in the fall and winter. Not only will the money returns be larger, but, with good care, the amount of milk will be also larger.

Value of Food Consumed.—We will now consider the question, "What and how the cow should be fed so that we shall get full value in money returns for food consumed." The scientific plan would be to first determine the amount of food of support, so computed as to make up for the waste of proteine caused by the action of the muscles—the loss of fat, sugar and starch burned in supplying the heat of the body, and in addition to that the amount necessary to supply the caseine, the fat, the sugar and the phosphates in the amount of milk we expected to produce. But as my manner of life has been more in the manner of doing than of study, I shall pursue a somewhat different course.

Land to the Cow.— I will set apart to grow feed for this cow, two acres of land, worth for farming $70 per acre. One acre I will devote to pasture, one-half acre to hay (which should yield one ton of early cut hay), and one-half acre to the growth of yellow flint corn, planted in rows four feet apart, with hills one and a half to two feet in the row, with from four to six stalks in a hill, which half acre will yield not less than seven tons of sweet ensilage. Larger yields can be obtained, but I think it desirable to supply corn rations in the ensilage ration than feed corn meal separate. We will leave enough of this corn in the shock to make one-half ton of ensilage.

System of Feeding.— As we propose to make the most of our milk in the fall and winter, we will commence our year on the first day of October, with our cow fresh in milk, and will feed her this month pasture grass, the shocked corn we have saved, and ten pounds of wheat bran daily. On the first of November we will go into winter quarters and feed up to the 15th of May (195 days) a daily ration of 45 pounds of ensilage, 10 pounds of hay and 10 pounds of wheat bran, fed in two feeds, making, with the corn fed in the shock, five tons of ensilage, one ton of hay, and 2,250 pounds of bran. On the 15th of May we will turn her on this acre of pasture and for the next 100 days we will feed her daily four pounds of bran, and (if she will eat it) 10 pounds of ensilage, as we have two tons left from the winter feeding. Forty days she may go dry and live on pasture grass alone, with this additional feed of 2,650 pounds of bran, which at $12 per ton, will have cost $15.90. Two acres of land has more than furnished feed for the cow a year, as we have ensilage left.

Yield.—This cow need not be a very uncommon one to make from the first of October up to the time we turn her to grass—225 days— from the feed we give her, 225 pounds of "butter, or one pound per day," which if good would sell this year, and almost any year for the last ten years, on the open market of Chicago, for 27c. per pound net, or $60.75. For the next hundred days she will make 60 pounds, worth 20c., or $12.00, 285 pounds in all. In making this amount of butter she will have given 5,600 pounds of milk, worth for feeding 20c. per hundred, or $11.20; calf $1.00, making the gross income $84.95, from which deduct the price of bran fed, $15.90, and you have $69.00 as the result of feeding the product of two acres of land to a cow—$14.00 for the pasture and $55.00 for the acre of corn and grass, and after paying the interest on $70 at 7 per cent. we have $9.00 for the pasture and $50.00 for the corn and hay. Had the cow come in in the spring, the product from the pasture would have been greater, but the net income smaller.

Profit.—The cow in pasture has cost no labor, and of the acre in corn and meadow, only one half has cost anything for cultivation.

The amount of net profit will depend upon the price charged for the work performed, which each one must fix for himself.

But unless he estimates it higher than we generally receive for what we do, the margin will be a handsome one—$59.00 ought to pay well for the work and the use of the cow, and farther this extra feed given to the cow when on pasture, will have increased its productiveness, and the manure made from feeding the hay and the ensilage corn, with that from the ton of bran purchased, if properly applied, will have maintained the fertility of the acre used to grow the winter food, and so the farm is richer rather than poorer.

Estimates Not too High.—But you say that these figures have no practical value, for they are merely imaginary, and that they are never realized in practice. True, in one sense they are imaginary, for they do not give the exact rations or the exact production of any particular cow. But the amount of production named for this single cow, and the amount of many estimates is exceeded by quite a number of whole dairies, within my acquaintance, numbering from fifteen to thirty cows each, and the ration named is one fed this winter in my own dairy of over twenty cows, and they have thus far averaged since the middle of November for each and every cow over a pound a day, the amount named in my estimates.

It is true that among our best dairymen more land is allotted to the support of a cow than I have named, partly for the reason that very little of our lands are worth $70 per acre for farming purposes, and partly for the reason that we have not yet learned how to grow and preserve our feeding crops, and how to feed them so as to get all we ought out of them. When we have learned this part of our business, we need not own all creation, or work sixteen hours a day, to make ends meet, or to provide a reasonable income for ourselves and families. We shall yet learn that a cow can be well kept and full fed upon the product of an acre of land.

Unproductive Capital.—One of the greatest hinderances to a better system of farming, and one of the heaviest of dead weights that the majority of Wisconsin farmers are carrying, keeping them comparatively poor, so far as having the available means of supplying their own wants and the wants of their families, is the large amount of unproductive capital tied up in land, and the small amount of working capital available to use in making those lands more productive. Let us now, for a few moments, consider whether this winter ration that I propose to give and am feeding my cows—45 pounds of ensilage, 10 pounds of wheat bran and 10 pounds of early cut hay — bears any analogy to that laid down by the scientist.

The German Formula — For a cow giving milk is 24 pounds of dry organic food, of which 15 pounds should be digestible, composed of 2½ pounds of proteine to 12½ pounds of carbo-hydrates.

Experiment Station Standard.—At the experiment farm, in 1884, 3.27 acres of corn averaged 4,490 pounds of dried stalks and 4,941 pounds of corn, or a gross weight of cured products of 9,431 pounds. Allowing this to be one-third of what this corn would have weighed had it been cut and put in the silo when fit for ensilage, one acre would have weighed 28,243 pounds, or 14 tons or the exact weight that I had claimed for my ensilage. I shall presume, therefore, that 45 pounds of ensilage will be equaled by 15 pounds of the same corn when thoroughly dry. We then have:

	Proteine.	Fat.	Carbo-Hydrates.
10 pounds of hay Containing.......	0.48	0.11	5.00
10 pounds of wheat bran containing.	1.30	0.30	4.57
45 pounds of sweet ensilage*....	1.30	0.19	6.86
	3 08	0 60	16.42

Or ½ pound more proteine and 4 pounds more carbo-hydrates than the German standard, but the proportions are very nearly identical.

Summary.—So that we may be reasonably certain that two acres of good land, handled as I have outlined, with a ton and one-quarter of wheat bran purchased, will furnish ample food a year for a cow that will make 300 pounds of butter, and that the hay, the bran and the ensilage fed as I have suggested will furnish rations nearly identical to those that science has indicated as being most economical in production and also giving the largest amount in returns, and I can not help but beleive that the succulence of the ensilage will contribute largely in making all the food more digestable, and so of increased value. There may be better ways than I have outlined, but when the dairymen of Wisconsin have learned how to keep a 300 pound butter cow for every two acres of land devoted to dairy purposes, by purchasing a ton and a fourth of bran per cow they will have taken a long step toward cheapening production, and will receive full value in money returns for food consumed.

---

*Equal to 15 pounds of dry fodder corn with ears, if my figures are correct.

DAIRYING FOR PROFIT.

By E. G. FULLER, Calumet County, Wis.

Third Paper.

Elements of Success.—The subject assigned me is a large one—so large in fact, that in the time allotted me, I can only give a glance at some of the elements which contribute to success, and hence to profit in this branch of agriculture.

The first thing to be considered in this connection is the man. It is a broad truth that no man can attain the highest success in any calling unless he has a natural love for the business or profession in which he may engage. Having this, he will naturally strive to gain all the knowledge possible in regard to his profession; not simply for the purpose of making his business more profitable, but because it is a pleasure to acquire this knowledge. When our labor gives us pleasure, half of its wearying effects are taken away.

Love for the Calling.—The man who would attain the highest success in dairying, must have a natural love for the calling. He should be fond of animals; because if he is not, he will not be likely to give them the kind and considerate treatment which is an important element in the care of the dairy herd. Some one of the institute workers has said, that the whole story of the care of the dairy cow was summed up in one word, "comfort." That about tells the story; and it takes a man who naturally loves his animals to look carefully to their comfort.

Who of us does not know so-called dairymen who approach their resting animals with a kick and an oath, when about to milk them? Who has not seen some fool of a man tie up a nervous cow and pound her, in order to break her of kicking or running away, when careful and judicious treatment was required? Such a man has no place in the dairy.

Requisites of Success.—The dairyman should be a man of intelligence, of education, and of business ability.

Only a few days ago, in an institute, the writer heard a paper read by an ex county superintendent of schools, in which he almost ridiculed the idea of education for a farmer. Agricultural colleges were denounced as a humbug, and the statement made that as soon as the farmer's boy got a bit of education he left the farm, and if he did not he was a fool for not going where he would have an opportunity to use his education to better advantage than he could on the farm. The writer of that article was certainly wise in leaving the farm, if he could find no room thereon for the expansion of his mighty brains.

Knowledge on the Farm.—There seems to me no calling or profession wherein a more varied knowledge can be used to advantage than on the farm. There is none which pays a larger percentage on intelligence, education, and business ability. Nature, mother Earth, responds bountifully to the man who seeks intelligently for her treasures, and it is just in proportion to the intelligence displayed in our calling that our profits are.

The Dairyman's Education.—Think of the diversified knowledge that must be possessed by the dairyman! He must understand the nature of soils, and their adaptation to different crops· He must know how to feed them, that they may not deteriorate in value; in fact he should increase the fertility.

He should know something of that most mysterious of nature's laws, the law of heredity, in order that he may breed intelligently, and thus produce animals that will contribute generously to his profits.

Care — Food — Marketing. — He should understand the anatomy of the animal body, and know the symptoms and remedies for at least the more common diseases among his stock, that he may treat them in case of sickness. He should understand the comparative value of different foods, that he may be able to feed his stock economically.

He should be a business man, and study the markets, so he may purchase what he needs to the best advantage; study the demands of the market, and seek to supply those demands at the time they are most wanted.

Keep Posted.—He should keep posted upon the advances being made in his business. The many agricultural papers, and bulletins of the Experiment Stations, should find their way to his home, and be carefully studied. But not all we read is gospel truth; hence the dairyman should be an experimenter to a certain extent, that he may satisfy himself of the true value of newer methods.

Get Near the Ideal.—No doubt many are saying that I am placing my ideal dairyman very high. Perhaps so; but ideals are always above the real, and it is only by placing ideals high that a high degree of excellence in any profession may be attained. Of course many are pursuing the business of dairying profitably who come far short of the ideal I have sketched, but I believe the nearer the ideal is approached, the more profitable will be the business.

Book Lore on the Farm.—While I believe that a great deal of book lore will always be found profitable on the farm, I would never consider it superior to good common sense, but if I can find a happy combination of the two, I think the union a good one.

Points for Consideration.—Now, I will try to notice a few of the points to be taken into consideration by the man who would pursue the business to the best advantage.

First, he should consider the branch of the business to which he would devote his energies—whether to the production of milk, cream, cheese or butter. Of course his location must do much toward shaping his decision in the matter.

The Sale of Cream—For city use is undoubtedly the most profitable way of disposing of dairy products, but comparatively few can secure this method.

Butter Making.—If butter is to be his specialty, he should decide how the product is to be manufactured, whether at home, or at the factory. While the latter system will prove a great labor saver, and in nineteen cases out of twenty the more profitable, the private dairyman who will throw himself energetically into his business, make a first class product, and market it in a business-like manner, will undoubtedly make the greater success. Of course no one thinks of producing cheese except upon the factory system.

Selecting the Cow.—Having decided upon the branch of dairying he is to pursue, he should select a cow adapted to the business, and breed her in a manner not only calculated to reproduce her kind, but to improve upon her. It may be urged that the average farmer about to engage in the dairy business, cannot afford to purchase thoroughbreds of any breed, nor is this necessary. Secure good native or grade cows, test them that you may be sure of their capacity, keep none but good ones; aim to secure a herd that will produce an average of not less than 300 pounds of butter per annum (the more the better), but the cost of production must not be overlooked. The profitable animal is the one that produces the most at the cheapest prices. Such a herd can not be picked up in a day. It must come as the result of careful breeding and selection. The herd should be headed by a thoroughbred sire carefully selected from the breed decided upon. He may be used five or six years, then another from the same breed and same general family should be selected. By careful and judicious selection, in a few years an excellent herd may be built up. As well expect to win the Derby with a Percheron as to expect to attain the *highest* success in dairying with a general-purpose cow.

In the East many dairymen do not try to breed their own animals, but depend entirely upon purchases to keep up the herd. Some make money by purchasing fresh cows, feeding them heavily for a single year, and at the end of their milking season turning them off for beef.

This is not what would be termed high class dairying, nor do I think it as profitable as where a man breeds his own animals judiciously.

Defective Stables.—Next we will consider something of the care to be given the herd.

Comparatively few of our stables are warm enough to keep milch cows to the best advantage. Warmth not only conduces to a more liberal flow of milk, but it also decreases the food consumption. The same food required to support two animals who have only the shelter afforded by a shed or the warm side of a straw stack, will support three warmly stabled.

Many of our stables are ventilated by a half inch crack every 12 inches, but when stables are of proper warmth, there is often a ventilation so that upon entering the stable, the smell that greets one is anything but pleasant. This is a matter that needs attention, as the health of the animal and the purety of the product depends largely upon the neatness of their quarters.

Warm Water—In winter for milch cows is another innovation, looked upon by many as a sort of hot-house method of heating cows. But the experience of the hundreds of dairymen who have tried it is so strongly in its favor that it can no longer be considered an experiment, but a steamer or tank heater will be considered a part of every well regulated dairyman's outfit.

Economical Feeding—Is another and very important point to be considered in the matter of profit in dairying; and it opens up a big field for study and investigation.

Judging from what I can learn through the mediumship of books, more progress has been made in the science and art of feeding during the past decade, than had been made in a century previous. Farmers are waking up to the fact that there is a science as well as an art in their vocation,

The educated minds of the nineteenth century are turning their investigations to the benefit of the farmer; and no matter how much the masses may scoff at those "scientific fellers" and book farmers, there are but few of us who are not, to a greater or less extent, reaping the benefits of their investigations.

Summering and Wintering.—Many farmers (but few if any of that kind are before me to-day) still pursue the old expensive way of keeping their stock through summer on pasture, and winter on hay and straw.

Their cows give milk through six or seven months of the year, and are kept through the winter at a positive loss.

The class that a few years ago recognized the need of succulent food to maintain their animals in thrifty condition, and supply this by means of growing root crops, has now found that the silo supplies the needed element at a far less cost.

A careful study of the wants of the cow, and the composition of feed stuffs have given us a clearer idea of what to feed and how to feed it in order to produce the best results.

Corn Fodder—Has formed no inconsiderable portion of dairy rations in the East for some years; yet we are just beginning to understand its value. When planted as it has been, sown broadcast at the rate of two or three bushels per acre, or planted in drills so thickly that no attempt was ever made to form an ear, no remarkable results were obtained; but to-day, with the methods of planting now in vogue, when eight quarts of seed will suffice for an acre, and eight to fifteen tons can easily be grown to the acre, each ton worth as much, pound for pound, as good timothy hay, we cannot shut our eyes to the fact that an important element has been introduced into our dairy husbandry.

The Silo.—But our corn fodder is difficult to cure and handle to the best advantage. The silo here steps in and offers an opportunity to store our fodder in the best possible space, and to preserve it in the best condition for feeding. It gives us a green, succulent food, upon which cows thrive well, and give as full a flow of milk as upon summer pasture. But in feeding ensilage it should be remembered that we are feeding a summer food, and must approach as near as possible to summer conditions in the care of the animals. A warm stable is a necessity in feeding this kind of food.

Improved Methods.—Not only has modern investigations improved our methods of manufacturing dairy products, raised the standard of quality, decreased the cost of production by means of cheaper food, and more intelligent use of food; but careful breeding and scientific feeding has largely increased the capacity of our cows, just as breeding and training has developed the modern trotting horse.

A Well-Balanced Ration.—Care and intelligence are needed in forming a proper ration for an animal. The two most important points to be considered are how to secure a well-balanced ration, *i. e.*, one which shall furnish to the animal the proper proportion of carbohydrates and albuminoids. The one to keep up the animal heat and supply the bodily waste; the other to be turned into fats and returned to us in the form of flesh or milk. But many combinations can be made which will supply these elements in the proper proportion and the point dairymen must study is how to make up such a ration at the minimum cost.

Of course those of us who have been brought up on a farm, and have had the advantage of years of observation and experience, have learned by actual trial what combinations give good results, and we would not be found giving a milch cow a heavy feed of corn meal when the forage being fed was rich corn fodder or ensilage, nor trying to balance a forage feed of straw or timothy with bran alone.

Rations Must Be Tested.— A German chemist named Wolff, has given us a table of feeding standards, based upon the composition of animal bodies, and their products. But while this may serve us as a partial guide, combined with the analyses of feed stuffs, all the deductions can not be accepted as absolute. In fact, there is a chemistry of nature which none of us can understand, and the rations given us must be subjected to actual trial and comparison, before we can reach a final conclusion as to their utility.

Chemical Analysis.—A striking example of the lack of chemical analysis to do justice to the merits of a forage ration is found in the feeding results experienced with ensilage. In nearly every case actual trial has shown it to be superior to what chemical analysis had claimed for it.

Now chemists tell us, that if properly handled, ensilage develops lactic acid while in the silo; that this in itself is a stage of digestion, hence requires a less expenditure of energy to digest, *ergo*, we get better results from a stabled quantity of green forage ensiloed, than from the same quantity fed in a green state. Is this true? Some first class practical men claim it for a fact, but it will still bear investigation.

Ensilage as a Ration.—Be that as it may, ensilage certainly forms the basis for the cheapest ration that can be fed our dairy stock. Contrast the cost of a ration with ensilage as a basis, with any other food that we can feed a cow, and note the great balance in favor of the ensilage ration; and when we remember that the practical results are in favor of the cheap food, I cannot see how our dairy men can hesitate to adopt this method of supplying their cows with forage.

Model Rations.—Here is a model ration given by Wolff, for milch cows:

	lbs.
Meadow hay	12
Oat straw	6
Mangolds	20
Brewers' grains	25
Cotton seed cake	2

At a moderate estimate this ration will cost 25c. per day.

Here is another compiled from his tables:

	lbs.
Cured corn fodder	20
Rye straw	5
Malt sprouts	6
Cotton seed cake	2

This is a much cheaper ration, costing 14c. per day, and in my opinion would not prove a good practical ration for a cow.

Another ration compiled from Wolff's tables:

	lbs.
Corn fodder	15
Bran	5
Malt sprouts	5
Corn meal	3
Cotton seed meal	2

This will cost about 16c. per day, and make a good practical ration, but too expensive.

It is useless to extend this list. Any leading agricultural paper contains plenty of these rations based on the German tables, Prof. E. W. Stewart supplying several papers with combinations, which will contain in a given quantity the proper quantity of the three elements—carbohydrates, albuminoids and fat. But while these rations may be very well to theorize upon, as a rule they are too expensive to be practical.

The Nutritive Ratio.—These standards call for a nutritive ratio of one to five for a milch cow. That is one part of protein to 5 of carbohydrates and fat.

The protein is the most expensive element to purchase in foods and some of our best dairymen get excellent results, by feeding a ration in which the nutritive rato is only about 1 to 4. The cost is much lessened and it is a question if the results are as good.

The Tables Theoretical. — These tables are theoretical. Prof. Stewart's rations are theoretical, based on these tables. Now comes in the dairyman's part. He can well afford to be an experimenter to a certain extent, in order to satisfy himself of the practical utility of these standards.

Prof. Armsby's Ration.—Here is a ration compiled by Prof. Armsby from the tables:

Corn ensilage	20
Clover	10
Corn meal	5
Bran	5
Oil meal	2

At present prices this ration will cost 19c. per day—too much for the practical dairyman.

Cost of Feeding.—Several of our Wisconsin dairymen manage to feed cows at a cost of from 7 to 10 cts. per day by making ensilage the basis of their ration, which, with the addition of a few pounds of bran, shorts or pea meal, will give excellent results. The last mentioned food is one that is deserving of more attention.

Pea Meal and Bran.—A year ago, upon my father's farm, we had to depend principally upon marsh hay as a forage ration. We had quite a large quantity of peas, and instead of selling our peas, originally intended, we ground several tons—mixed equal quantities by weight, of pea meal and bran, and secured the best results of any grain combination we could make.

Summer Feeding—Is also a place where we can make decided improvements. At the price of our Wisconsin farm lands, we can scarcely afford to depend upon pasture as our only summer food. A light grain ration and a practical feed of soiling crops and perhaps of ensilage will be found a measure of economy. Rye, corn, peas and oats, clover, millet or Hungarian grass can be used to advantage for this purpose.

Economy of Labor.—Another thing we should do is to study economy of labor in the arrangement of our buildings. This is too often neglected, and the labor of caring for our stock made double what it ought to be.

If the farmer is to make butter, he should have a neat and convenient dairy-house, well supplied with all the modern conveniences in butter making, and put upon the market nothing but a first class product. Let every package go into the market with his own name upon it, and let that name stand for a synonym of the purity and fine quality of the contents of the package. In time he will find that it will give an added value to every package.

Object of Paper.—The object of this paper has not been so much to give specific directions or instruction upon any particular point in dairying, as to awaken thought all along the line. And when a man gets to thinking seriously and earnestly upon any topic, he is on the right road to success.

EQUALIZING DAIRY PRODUCTION.

By Hon. **HIRAM SMITH**, Sheboygan County, Wis.

Fourth Paper.

Expensive Methods.—The underlying principle of all farmers' institutes, dairymens' conventions and agricultural conventions, is the supposition or knowledge of the fact that many of the methods and processes pursued by the farmers of this State, and all other States, are expensive, which are pursued continually at immense loss. If all the farmers of this State had been practicing upon sound scientific principles, their labor all well paid, their methods of feeding such that nothing should be wasted, and no losses sustained, selling their products at proper times so that no waste is realized in that direction, we would have no necessity for farmers' institutes. But because that is not true, is the reason of the farmers' institutes, that in this way we may study facts by which we can correct our errors, and, therefore, I wish to point out, on this occasion, a few of the errors that a great mass of the dairymen in this State are guilty of without any profit to themselves, without saving in labor, without doing anybody any good whatever. They are constantly wasting a very large percentage of the products they get out of the soil and out of their cattle.

Summer Dairying.—First, the great mass of dairymen in this State are engaged in summer dairying. Their cows commence to give milk about the last of April, or the first of May, running until cold weather; then they dry off, and the winter product amounts to but very little.

There are a few exceptional localities that have learned better in that respect. Now, I know something about this, for I have paid a heavy tax of waste in pursuing this same course. You all know the difficulty of marketing butter in the summer is very great. You read the market reports, and you see that nearly all winter butter has sold for thirty and thirty-five cents, while nearly all last summer it was fifteen and sixteen cents.

Now, you know without my telling you, that the great body of the milk is gathered in May, June and July. Cows will give a big flow of milk then; they are having the best feed of the year, the best you have got. You can hardly find a poor cow at that time of year. Your cow is giving a large flow of milk, you are taking the milk to the factory, it is being manufactured into butter and cheese, and when the sales are made, they are the lowest of the entire season.

We were brought up to do business in this way; we knew of no other way, and a good many of us can scarcely see how we can avoid it; but is there any motive to avoid it? Most certainly. There is at least thirty-three per cent. motive to change the whole business, and a very large portion of the farmers of this State are adding thirty-three per cent. without adding an *iota* to their investment and without giving one day's extra work to the profit on the cows.

Winter Dairying.—How will you do it? Have your cows come in when dairy products begin to go up in price, when they are scarce in the market, from October up to about this time of year, and dealers are handling it with a great deal of confidence. They can send it all over the South, in safety, and there is a good paying price offered for it. Now, why cannot the change be made? The objection is often urged that if I have a winter dairy I must have a warm stable. Of course, but you want a warm stable anyway if you are going to keep cows. You are suffering a great loss if you are feeding in a cold stable. You can't afford the expense of warming your cows with expensive food.

Make the Change.—After you have got your stable warm, then the change in very simple indeed. You have more time to attend to the manufacturing of butter if it is done on the farm than you have in the summer. In the summer you want to be engaged in cultivating your crops. In the winter there is but little to do. Therefore, you have more time to attend to your butter, and if your cows are giving the most milk and you are getting thirty-three or four or five, frequently up to forty cents, for the butter, it makes you feel pretty well, and a man who feels well, happy and bragging to his wife at the end of every sale, begins to think it is a pretty good business; but when a man has an immense amount of milk in June and his butter is selling for fourteen or fifteen cents, he goes home and says to his wife: "Well, this is poor business, I have got to get out of the dairy business."

But you can't get out of the dairy business in Wisconsin. Where will you go to, what will you do? We are here. we can't get away and we don't want to get away. Some men talk about raising big horses. It don't pay like a dairy.

Reform Methods.— We can't better our condition very much by going out of the business. There is a good opportunity to do better right where we are. Our investments need not be enlarged; but let us merely reform our methods, and make our labor count, and when we work hard let us work for thirty cent butter instead of fifteen cent butter. We can make just as many pounds; we can make more pounds. Cows will milk more months in the year coming in in November and December, when they would naturally begin to fail in their milk, and then when they do begin to fail in their milk they have succulent fresh feed, and it keeps them along and they seem to forget to dry up. It is an uncommon thing for my cows to go dry more than four weeks, and if one does, I say: "That is the one to weed out.'; We can accustom our cows to milk eleven months, and they will give the largest flow when we can get more money, and the least when the products are worth less. If our cows dry up in August, and butter runs down to fifteen cents, it doesn't bother me. I don't care much where butter goes.

Results.— It makes one more watchful, it makes us happier, it makes a man more liberal to his wife, and she will treat him better, and she ought not to unless he treats her well. You can clothe your children better and spend a little more money every year giving your son and your daughter an education, so that they can be somebody in the world. It don't pay for them to grow up and get sick of the farm and go to Colorado, and come back and be without any interest in the farm, without any fixed principles. We have ample room right here to make all the needed improvements, which we can easily and cheaply do.

SHALL FARMERS' WIVES MAKE BUTTER?

By JOHN GOULD, Western Reserve, Ohio.

Fifth Paper.

They Should Not be Asked.—Shall the farmer's wife make butter, and if so, how? In the first place she shouldn't be asked to make butter any more than she should be asked to spin the wool and knit stockings. That is my position on the question. The co-operative factory should take charge of the butter making. But we are not all ready for it; there must be preliminary steps taken before we get to that.

Good Machinery Required.—Then, how shall the farmer's wife make butter? If the farmer has good machinery on the farm, he should furnish his wife with good machinery with which to work, to make the butter, and any man who doesn't provide his wife with good machinery with which to make butter, should leave his own machines in the barns and cultivate his fields as he has for years past, for his wife is just as good as he is.

Good Milk.— Another thing; if the farmer's wife makes the butter, he should do the milking. A farmer's wife in the year of grace, 1888 is not built for milking. But to come down to sober realities. If she has to make the butter, she must be provided with good milk out of which to make it, because the milk determines the quality of the butter when made. No one can make good butter out of poor milk. If it has become loaded with stable odors, it will have a stable odor when made.

Good Feed.—Now, how shall we get good milk? You have all heard about the good cow and her good food. We must have first a good cow; she must have all the comforts that a cow is entitled to; she must have good feed and good care, and then we may reasonably expect to get good milk. But remember this—if we are after good butter, then we need to feed a food to our cows which is in the line of keeping with butter, so we should feed blood-producing food. You have been told here this afternoon that milk is an elaboration direct from blood, so if we don't have good, abundant blood, out of which to elaborate this milk, then we fail in getting the highest type of milk out of which to make the butter. Now, our cows should be kept in a cleanly stable, and all the sanitary conditions observed which go to make a good production of butter.

Perfect Cream Raising.—The milk having been brought into the house as quickly as possible after the milking, should be set out as quickly as possible, so as to get a perfect cream raising by the falling temperature of the milk. If our cream stands around until it gets practically cold and we set it out then, we don't get good results in our cream raising. Milk is made up of several elements, one of which is sugar, another is caseine. When our milk gets down to a certain temperature, there is a change of those elements that appear in the milk and prevent the cream coming to the top; so we will set the milk as rapidly as possible, and at as warm a temperature as we can.

How Shall We Set the Milk.—Just how we shall set it, I don't know. If you can get some good creamer, that is the better way; if you can't, set it in the good old way, in a room free from contaminating influences. Let us skim this cream before the milk gets thickened under it. The market is paying a high price for butter flavor and not for buttermilk and salt flavor. A lot of thickened sour milk may get into the churn and is so much influence against getting a high quality of butter; therefore let us skim the cream before the milk thickens.

Ripening of the Cream.—Let us hasten the ripening of this cream in the winter in some way. Cream usually stands too long before we churn it, so that acids attack some of the fine flavoring oils that give the butter its distinguishing characteristics, and we lose that fine flavor; so we will hurry the ripening of the cream by keeping it warm. I wouldn't care if it were warmed to seventy degrees, and then brought back to the churning point.

Churning.—Let us churn our cream with some of the later ideas of churning. We do not churn the cream to tear off any imaginary envelope that was once supposed to exist upon the globules. We simply churn it to get the buttermilk; the butter gathers afterwards, so any revolving churn is better than a churn that beats and mashes the globules of the butter. We want a thermometer so as to keep accurately the temperature of the cream. If we use our fingers for a thermometer, we have every time to go and wash our fingers, or do the other thing. Stop churning when the butter globules appear about the size of small shot. There is a little difference of opinion about this, but that is a good point at which to stop.

Washing.—Having churned, don't fill the churn over half full. I want some space when I wash out the buttermilk. Why shall we wash out the buttermilk? There are sugar and cheesy elements in it that we can wash out much better than we can work out, so that to our four or five gallons of cream we put in a couple of handfuls of salt. If I put in a little salt and churn a little bit, the butter rises right through the buttermilk and comes to the surface. Let it stand a moment and then we can draw the plug from the bottom of the churn and draw the fluid out. Put back the plug; there has been no loss of butter at all. Add a little more water and salt, and the next time it will come to the surface a great deal quicker and if it doesn't the second time, try it the third.

Salting.—Now, let this drain a few moments and get the great bulk of the water out of it. I want to try and salt this butter and pack it at the same time. After it has drained so the water only occasionally drips, turn the churn down and you have your butter in the bottom of the churn in a granulated condition like sand. Sprinkle in the salt. Put on ten ounces, or a little more, and if it is too much it will not do any harm as it goes out with the water. There are two ways of salting. One is a brine process. You put in brine as salt as you can get it, draw out this brine and rein force it with some more and turn it right back on the butter. Use this brine a little warmer the next time, probably about sixty-eight. Then, your brine is fully strong. It gives you a full half ounce to the pound, which is all you can do with the salt. In this way we get our butter at full strength, and we can gather it simply into a big ball in the churn with this brine and bring up our package alongside. The great trouble in trying to pack our butter in the churn was, that we attempted to do it with the butter too cold. It was mealy and we did not get it into the box; but if we bring it up to sixty, we can put it into our package and press it down into it, and we get all our butter and it is solid enough for the market requirements. If that is not quite salt enough for the market taste, then turn more salt into the churn and churn it into a big lump and pack it practically the same as with brine salting.

Granulated Butter.—We want to save another little bit of work here. The market is asking us for granulated butter, and if we will fill the boxes with the best granulated butter and then take a butter ladle and smooth it all slick, we have lost that granulated surface and lost a point with the buyer. So instead of that, let us take a stout string and draw it across, taking off a flake and leaving that granulated surface without any further working. Use new muslin to put over it. The market don't pay us any more for old muslin with button holes worked in it. Then cover it, put it away from the light and air as quickly as possible, and keep it in the best condition for the market.

Discussion.

MR. WHEELOCK.—Mr. Gould says, take the milk into the house as soon as it is milked. My system would be to have a creamery nearer the stable, and not take it into the house at all.

MR. GOULD.—That is right, but I said if you had not a creamery.

MR. WHEELOCK.—Five dollars will fix a creamery close to the barn where you won't have to carry it over twelve feet.

My plan is this: I am milking twelve cows; I use the shotgun cans; I have a tank which will hold eleven of these cans; it is set near the barn and there is a sort of open shed built over the top of it, so that when I want to skim in stormy weather, I can stand there out of the way. In cutting my corn for the silo I saved all the refuse, which was about three baskets a day, and that I packed in around my tank, and it is practically frost proof. The water is never frozen around the milk.

MR. CAMPBELL.—You say stop churning when the butter is the size of shot? Now, shot varies like the old lady's piece of chalk.

MR. GOULD.—Well, No. 6, bird shot.

MR. HIRAM SMITH.—There is some question about the amount of salt that can be retained in the butter. Dr. Babcock has had considerable experience in these matters, and I would like to hear what he has to say on that point.

PROF. BABCOCK.—At the New York Dairy Show, I took fourteen samples from the butters which obtained premiums at the show, and all of these being analyzed, the highest per cent. of salt which was found in any of these samples was four per cent. Four per cent. is just about two thirds of an ounce to the pound. The average per cent. of salt in those butters was less than two per cent., which is considerably less than half an ounce to the pound of butter. The fact is that in salting butter, if more than half an ounce of salt is added, the water retains a large portion of this, and it is worked out. The water which is removed in working butter is very strong brine in every case, and the water which should be retained in the butter can not hold more than half an ounce to the pound under any condition. If more salt is added than will dissolve, it remains as crystals in the butter, and is a very serious objection which should always be avoided.

Mr. Gould.— May I ask you what the variation was in the water contents of these samples of butter?

Prof. Babcock.— As I remember, the highest was a trifle over fourteen per cent.; the average was about nine per cent. in the butter. They were nearly all butters packed in large packages.

Mr. Gould.— Then the report in the American Dairyman that one of those samples of butter had twenty-one per cent. of water was a misprint.

Prof. Babcock.— Mr. Gould has confounded the two tests. The butter which contained twenty-one per cent. of water was butter in the sweepstakes class, which was taken immediately upon working, and had not been packed at all.

Mr. Bender.— Can you pack butter and salt it in the churn, as you have just stated, with your ladle, and get out the water so that the package won't drip, and there will be enough salt in it?

Mr. Gould.— Yes. By gathering it and putting it in in small amounts, we get just the right condition we want. The trouble is, we try to put in five or six pounds at a time instead of a small amount. We take out the moisture with a damp cloth, or by just tipping it one way. Between each layer you have to take up the surplus moisture.

BUTTER-MAKING ON THE FARM.

By F. C. CURTIS, Columbia County, Wis.

Sixth Paper.

Loss Sustained by Dairymen.—At the late Farmers' Conventiom at Madison, Mr. H. C. Adams gave a very instructive address on dairy mattors, the prominent feature of which was the great loss sustained by the erroneous practices of those having charge of farm dairying. My rememberance is that, by a careful computation of statistics, he made the anual loss for the past year to exceed $3,000,000. Major Alvord, in his address at a similar convention two years ago, stated that more than one-half of the butter offered for sale in the great city of New York, was bad— so bad that it was unfit for table use.

Why are Prices Low?—For the last few years I have noticed that the market reports of our large cities have quoted butter at about thirty-two cents per pound down to eight cents, and some times even lower. The natural inquiry then comes up: "Why this wide range in prices?" It is not wholly on account of the quality of the milk from which the butter is made, for we find that good milk is susceptible of being made into bad butter. It is not on account of the labor involved, for it is much less labor to make a first class article of butter than it is to make the villianous compound we are complaining of. It is not necessarily on account of the want of information, for I take it upon me to say that it is my candid opinion that a more enterprising, persistent and philanthropic set of instructors never existed than Wisconsin's once little band (now a mighty host) of dairy reformers. They have been foremost on all proper occasions, to give the public the benefit of their experiments, observation and research.

How to Make Good Butter.—It has been shown in public addresses, in printed matter, in various forms, all freely pressed upon the public, that it has been and is not more than half the labor to make good, high priced butter, that it has been or is, to make this bad, low priced compound called butter. While this is incontrovertibly true, there is a difference of opinion as to how this labor is to be applied, to bring about the desired result.

One party claims that it can only be done by collecting the milk or cream in factories, where all the required facilities and skill necessary can be concentrated. Another party claims that, with few inexpensive implements, and properly directed efforts, a first class article of butter can be made upon the farm, equal to the demands of commerce. But this difference of opinion is of little consequence, for it is plainly apparent that all the output of the factories is good, and also that all the farm made butter, where the cream is raised by the "deep setting" process, and the butter churned and worked by the granular process, comes under the head of good butter. It is also apparent that these two processes of butter-making are mainly the only sources of good butter in the market reports, and that all this bad butter—more than one half of the butter that reaches the market—is made on the farm, and that, too, by processes which are double the labor of the simple improved process so many times described.

Old Style Butter-makers.—I will illustrate the position of the old fashioned butter-makers in this way: A few days ago I was accosted by a well informed farmer, who asked me what I was getting for butter. I replied, 30c. per ℔. With a shrug of the shoulders, and a sickly smile, he said: "I should like to know how that is done." Said I, you were over to Poynette to the institute, were you not? "No," he replied,—"my wife don't take to the new fangled notions, and I could not afford to waste the time. Not only that, but my wife makes just as good butter as anybody, and it is sheer robbery for those merchants to pay only 16c. per ℔., when they can get 30c." I replied, I do not believe these merchant have made a dollar a year on their dealings in butter; that they have really lost, and lost their character also as butter dealers by being compelled to buy and sell the inferior butter made by you and your neighbors. I pointed out to him some of his neighboring farmers who had no better facilities than himself, and who had adopted the improved deep setting and granular process. They were shipping there own butter and getting about 25c. per ℔., net returns. They did not offer their butter to the country merchant, whose character as a butter dealer had been ruined—if he ever had any good character in that direction—but shipped it to a butter market, on their own responsibility. Perhaps at first they were a little discouraged by not getting quite as much as they expected, but they soon learned that they alone were responsible for the quality of their product, and soon mastered the requirements of the market—a neat looking tub of butter, good, solidly packed and uniform in appearance when turned out of the tub.

Novel Way of Packing.—At the request of Superintendent Morrison, I have brought a tub of butter as an object lesson.

I take off the cover, turn the tub bottom upward and take off the tub. Now you can examine the butter. You will notice at this point of the butter the packing is imperfect. This was done to show you how imperfect packing looks in contrast with perfect work; which, I think, is plainly apparent in the rest of the butter. It is claimed that the nicest form in which butter can be placed upon the table is in a neat print, but it will be readily seen that butter in prints cannot be transported to distant markets, except at extra labor and cost, and at best they get mussy, while butter properly packed into tubs of this character, in refrigerator cars, is now transported as far as Philadelphia and New York, in about three days, in perfect condition The dealer or consumer can select the sized tub he wants, strip his tub, as I have done before you, and cut from it a block of butter fully as neat in appearance for the table as the nicest butter print fresh from the hand of the dairywoman. Then the tub can be replaced on the butter, using it as a cover, which, if kept in a proper place, will remain in good condition for a reasonable time. The dealer in butter wants the larger tubs to cut up for retailing. For these reasons, you notice why I am so particular to impress upon you the importance of solid packing in the tub.

How I Make My Butter.—There are doubtless some in the audience who would like to know how this butter was made. I keep about twenty-five grade Jersey cows, which come in mainly in the fall and winter. These are always put in the stable to milk, and also in inclement weather. I farm with a view to feed these cows well, but the past dry season so shortened crops that I have fed them in the stable, since the 15th of October, twice a day, one feeding of ensilage, two of straw, and ground feed composed of two-thirds bran and one-third oats and corn, ground, five quarts each, and warm water to drink. I think it safe to say they never did better or looked better than they do at the present time.

Setting the Milk.—Our custom is to milk about twelve hours apart, taking with us cans to hold the milk. This is brought to the cistern near the house, where it is strained into cans eight and one-half inches in diameter, and twenty inches deep, with bailed handles and close covers. These cans are lowered into the cistern, four at a time, by a windlass, which rests on the curb, and is held at any point with a racbet wheel. The cans are filled to about three inches of the top, or so they will float. The cistern is about fifteen feet deep, and holds about one hundred and fifty barrels. It is filled from the well, one hundred and ten feet deep, by a windmill. The stock of the farm is mainly watered from the cistern by a large hand pump. This keeps the water in the cistern always fresh and cold. I have never known the water to be warmer than 55° in summer, nor colder than 40° in winter. This insures what I claim to be about as good a temperature and as little labor for creaming the milk, as can be obtained by any method.

Skimming.—The milk remains in the cistern between milkings, and is then removed to the house where it may be skimmed at once or remain longer unskimmed.

Churning.—The cream is kept in a tin vessel, and is stirred when new cream is added, when it is kept until it acidulates—until it begins to thicken. Then it is churned in a rectangular churn, at a temperature of 62° by a floating thermometer, to granulation. The buttermilk is then drawn off and well water is introduced to wash out remaining traces of buttermilk.

Salting.—The butter is now in fine particles; just in the right condition to salt. How much salt is now the question. If the salt is good dairy salt (none other should be used), there is little danger of getting in too much, provided you do not get in more than will dissolve.

This butter was made in a fifteen pound churning, and a heaping pint bowlful was used, which is as much again as was needed to flavor the butter; but it was added to the butter in a moist state; incorporated well through it by a few turns of the churn. It was allowed to rest about four minutes, when the churn was revolved and the butter worked into a mass, at which time some two quarts of strong brine were found in the churn. The butter was then packed solidly in the tub with a common butter ladle.

It was once held, and is still held by many, that butter must be held over some twelve or more hours and re-worked before packing. My reply is, here is the butter made as I have described; find fault with it if you can. I court criticism, and am ready to explain more fully any position I have taken in this paper.

MY EXPERIENCE IN DAIRYING.

By C. P. GOODRICH, Jefferson County, Wis.

Seventh Paper.

Selling Fertility.—The year 1872 found me the owner of a small farm. At last my debts were paid and I had a clear title to the land. This had been accomplished by grain raising, and I found that I had been slowly selling off my farm, a little at a time with each load of grain hauled away, until its productiveness had been so much reduced that it required the closest economy to make my income from it sufficient for my necessary expenses. The prospect was not cheering. My farm was gradually growing poorer; I earnestly wished to give my boys better opportunities for gaining an education than I enjoyed in my youth; my health had failed. It was plain that if I was to accomplish anything, a change *must* be made. I must use my brains if I had any.

A Start in Dairying.—About this time some were turning their attention to dairying. I had not thought very favorably of the business; had kept as few cows as possible, just enough for my own use, two or three usually, and deplored the necessity of keeping even these. In fact, I did not like cows—

could see no money in them. But a cheese factory was started in the neighborhood, and thinking I might get a little something out of it, I increased my number of cows and patronized it in summer, and during the fall and winter made a little butter, (which was sold at a very low price at stores and groceries), and took my pay in goods at a very high price. On looking over my books, I find that the year 1875 was the first that the income from my cows was enough to make me think it worth my while to keep an account of it. That year the total proceeds from nine cows were $348, a little more than $38 each. It was said I had done well. It certainly was something. I had received pay for keeping the cows, as I kept them then, and a *little* besides to go toward paying for the work of milking, etc.

Variation in Prices of Butter.—Circumstances soon occurred that opened my eyes wide. In the fall of 1875, after the cheese factory had closed, I went into partnership with a friend living in Philadelphia. We scraped together a few hundred dollars with which I was to buy butter and ship to him and he was to sell it. Not considering myself a judge of the article, I relied mainly on the word and character of the maker. When the account sales came, I was astonished at the great variation in prices of the different makes.

Secret of Good Prices.—Of course, after this, I tried to buy so as to make something. I shipped to different markets—New York, Boston and Chicago, and still this great variation occurred. One man's make sold away above others in every market. I have just been looking at one of those old account sales, and find that the prices ranged all the way from 15 cts. to 32 cts., and this particular make was 43 cts. per pound. Our own make was 30 cts. This was in March, 1876. My wife and I examined the butter closely, and for our lives we could not see that the butter that sold so high was any better than much of the rest, or any better than our own make. But there was more money in it, sure, for it cost no more to make it, and I was bound to find out the secret if I knew enough. I showed the maker the account sales, and asked him if he could tell me the reason of the difference in price. "Is it all a fancy?" I asked. He said: "You may call it a fancy if you like. My butter is made to suit the fancy of those who are able and willing to pay good prices for what suits them." At my request, he gave me particular instructions as to how his was made, all the way from the care of the milk, the time to skim, ripening the cream, churning, working and packing the butter. I went home and told my wife what he said. She was enthusiastic to try to make butter that would sell for something. We went at it, and soon prices began to mend. I went to reading everything I could get on the subject. Took dairy papers, from which I learned much. Especially was this true of the dairy department of the Jefferson County Union, now Hoard's Dairyman. In the spring I built a small milk house near the well, detached from the dwelling, and we made butter all summer. I visited many of the large creameries in my part of the country to learn the best methods. I have ever since been studying and learning, and have attended nearly all the dairy conventions, trying to keep up with the times, and have not learned all yet.

Money in Butter-Making. — The year 1886, the proceeds from the same nine cows footed up $696.42, an average of $77.33 per cow. I now knew there was money in butter-making.

Setting the Milk.—The first summer I set the milk in common ten quart pans, set in a sink which extended around three sides of the room, and would hold water. Cold water was pumped in after each milking, which cooled the milk sufficiently to make the cream rise. This worked well, but was a great deal of labor. Since then I have put in improvements and fixtures at some little cost that have reduced the labor to, I think, about the smallest point.

Profit from Sixteen Cows.— For the past ten years I have kept from 12 to 16 cows, and have averaged, for the past seven years, over $1,000 a year net proceeds from the sale of butter alone. Last year it amounted to $1,243. By careful testing of cows, selection in breeding and better feeding, I have managed to make my cows produce more each succeeding year, until last year my mature cows produced an average of 357 pounds of butter each, and total proceeds of $107. I find that the better I feed the more profit I make, using, of course, what judgment I have and what knowledge I can get as to the proper kinds of feed for milch cows.

Feeding Bran.— I have fed bran for the last two summers, even when the grass was the best. I must tell you how I came to do that. I had always contended that good grass, and plenty of it, was a perfect food, and could not be bettered. Of course when pastures were dry and poor I had always fed grain. In May, 1886, the grass was good when I turned my cows out to pasture, but not wishing to change too suddenly, I continued the bran for awhile. They were giving then 400 lbs. of milk and making 18 lbs. of butter a day. I then gradually left off the bran feed and, in a few days, the amount of butter had dropped to 15 lbs. a day, although the amount of milk continued to be 400 lbs. It occurred to me to try the effect of feeding bran again. I fed 100 lbs. a day, and soon the amount of butter was again 18 lbs., although the daily amount of milk was still unchanged. The value of the bran I fed was 60 cents a day, and the three pounds extra of butter was 60 cents. I was getting pay for the feed as I went along, and reasoned that the cows would do better the next fall and winter on account of being kept in better condition. I am sure that was the case, for the yearly average per cow was increased, I believe, fully 50 lbs., owing to feeding an extra half ton of bran, so that for every dollar laid out in extra feed I got back two dollars.

Profits of the Farm Increased.— Now, this $1,000 and over received for butter each year is certainly that much added to the net profits of the farm, for the income from the sale of other farm products has, for several years, been enough greater than formerly to pay for the extra labor caused by the dairy. This is due to the increased fertility of the soil. Besides, a little ready money coming from the dairy has enabled me to make some needed improvements, among which is tile draining some wet land which was nearly worthless, and is now the most valuable and productive I have.

I cannot, in the short time allotted to me, go into all the details of how I have learned to manage my cows, handle the milk, and manufacture and market the butter, but I have given you a brief outline of the main facts.

Make a Start in Dairying Now.— My talk is not directed to those of you who are already successful in dairying and are, of course, prosperous and happy, nor to those who are making a success in other lines of farming but to the scores of you (and I know you are here) who are in the fix I was 13 years ago. And some of you are, in some respects, worse off, for your farms are loaded with mortgages that are piling higher and higher each year, and you will soon be buried out of sight unless you do something different. I would most earnestly urge you to make a start in dairying *now*. Build a tank, set it near your well, make a shelter over it. get a few cows, and you are started; all this will cost but a trifle. Get a few more cows; but if you don't feel able to do that, take good care of and feed well those you have, and in a few years you will raise some good ones. But the most important thing is to learn the business. You must read and study and find out what others have learned. Lay out $10 in dairy literature. Ten dollars is a very small sum; you have only to leave off an occasional cigar, or some other useless luxury, and you have it. Learn all you can and do the best you can. If you have 100 or 120 acres of fairly good land, you will, in a few years, be able to add $1,000 net to your yearly income, and be making your farm better all the time. Your wives will help you, I know they will, and be glad to do so if you will only give them a chace and furnish some conveniences. What does an added $1,000 a year mean? It means paying your debts, educating your children, improving your surroundings and, if you choose, laying something by for a time of leisure and rest, or old age. *I know you can accomplish this.* If you ask me how I know, I can give you the best of evidence: *Because I have done it.* You have just as good ability, if you will only use it, and most of you are able to do three times the manual labor that I am.

ECONOMY ON THE DAIRY FARM.

By S. B. MORRISON, Jefferson County, Wis.

Eighth Paper.

Capital and Credit Needed.—In these times of low prices and poor crops we hear so much about economy, and the farmer who has obligations to meet must practice it rigidly, that we dislike to hear even the word mentioned; but the economy which I shall discuss is not the penny-wise and pound-foolish plan so often pursued, but the wisest distribution of forces for the accomplishment of certain ends. It is nearly impossible for the poor man to economize, for he must do as he can, not as he would like.

It requires the combination of capital and good credit to manage the farm economically, and how foolish it seems to see one go deliberately at work to destroy his credit, which, when once lost can not be regained.

Such an one is controlled by circumstances, whereas he should, in a certain measure, control them.

Use Business Methods.—The farmer's only hope is to use the best business methods in the management of his business; we can't form a monopoly or a trust, for it is such hard work for us to get trusted.

Experience the Best Teacher.—The few thoughts which I shall endeavor to present are suggested mainly through the line of experience. Experience is a dear school, but it is said that a certain class of persons can learn in no other. The lessons that I have learned in this school are very dear to me—some of them cost me a hundred dollars, and I prize them highly because they were so dear.

About five years ago my father gathered me about his knee and called my attention to the desirability of my possessing the ancestral acres. He said he would sell the same to me and take my note, provided I would pay him an interest equal to the amount invested in government bonds. I remarked that the bonds were about 12 per cent. above par and my note, with liabilities $10,000, and assets $2,000, would be about 25 per cent. below, so that the latter would be the better investment. Of course, being a shrewd business man, he saw the advantage, and the farm was mine.

Marketing Butter.—The farm being well adapted to dairying, I determined to make the butter product a specialty. Learning that the parties who supplied the Tremont House, Chicago, were not sending them enough, the steward, after trying a sample tub, said he would take all I made; but there are two dull seasons in the hotel trade, and during these times I was obliged to send to commission merchants. This was quite unsatisfactory. So I went down to Chicago, among the employees of Lyon & Healy's music store and fixed it so that when I did not send to the hotel I could pack in 25 lb. tubs and send to them, charging about Elgin quotations, saving freight and commission. The last two years the Tremont has taken my entire make, paying highest quotations and no commission. I think that in the five years, I have saved $200 per year by handling my own butter. A small amount of butter is marketed in this way compared to what might be, if the farmer would only pursue business methods. St. Paul, Minneapolis and the large towns in the northern part of the State offer good home markets to the farmers living near.

City and country are not as far apart as they were 25 years ago, owing to the increased mail and traveling facilities. I could mention farmers living near Ft. Atkinson, Whitewater, and Elkhorn, who supply families in these small towns at from 25 to 30 cts. a pound per year. As our towns increase in wealth, good butter is wanted to go with the other good things, and people are willing to pay for it.

Last summer Mr. Flack, of Elkhorn, sold butter to farmers who took their milk to the factory, and to day-laborers, for 18 cts. per pound, the parties furnishing the jars, when Elgin was only 17 cts.

Good butter has paid better the last five years than any other farm product.

Good Farm Labor.—The question how to secure good help upon the farm is as serious a question as any with which the farmer has to deal. The discontent among laborers which characterizes the present age is by no means confined to the cities. We feel it just as much upon the farm, and while wages are higher, the help is more unreliable and the work more unsatisfactory than ever before. Now, the farmers are at fault for this state of affairs, and I am convinced that the system of hiring men for eight months in the year, and then turning them adrift, is a vicious one, and so long as we do this we will have trouble enough.

How to Secure it.—Bring dependent upon hired help, we soon found ourselves at their mercy, and that if one was dissatisfied, he could not leave without stirring up a rumpus among the others. We were on the ragged edge most of the time. A tenant house seemed the most feasible way out of the difficulty, so we built a small one, and the tenant is now on his third year. His wife helps milk and is always ready to assist in the house when the festive hired girl skippeth out. This plan has worked so well that we think strongly of building another tenant house, and doing away with the girl altogether. It costs nearly a dollar per day to keep one, and when they are needed the worst they have business at home. A large number of tenant houses have been built in our vicinity, and I have yet to hear of a person who is not pleased with the system. Hire a good industrious foreigner who has been here long enough to get the smart off, and he becomes attached to his little home, is always there, takes an interest in farm matters and is worth two ordinary hands. There are more parties wanting houses than there are houses, so it gives a man a chance to pick his men, and hire none but who can give a good recommendation from the place he has left.

Hire in the Spring.—If we hire the man in the spring, he can't leave in summer, for he must then forsake his garden, potatoes and corn, and in the fall, with a long cold winter before him, what else can he do but stay? Think of this oh ye men who chase from Dan to Beersheba for hired help, and see if, by using a better method, you can not have plenty of help the year round! It takes a large burden off the farmer's wife, who has enough to do to raise the family without running a boarding house beside, and that without sufficient help.

Farmers' Wives Work too Hard.—The young farmer with a mortgage on the farm thinks that he can't afford to keep help in the house; so the wife and mother is compelled to rear the family and do all the work besides. Now one or the other is neglected, and the good doctor's bill tells better than I can whether it is economy. It sometimes looks as though farmers' wives were harder worked and poorer paid than any other class of women whose husbands are worth what the farmers are. The farmer has one method by which he can curtail expenses, and that is by the plea of "hard times;" he can always fall back on that.

Make Your Wife an Allowance.—In dealing with the city people, we found that most of them allowed their wives a certain amount for household and personal expenses. We have found that this works just as well on the farm as in the city. With a certain amount of ready money at the beginning of every month, the good wife can take advantage of baits thrown out by enterprising merchants and can run the house 25 per cent. cheaper, than in the old way. Then everything is squared up, and we don't get as many statements as we used to, and if she does her work alone, she receives the benefit. She also learns how to handle money, and going to town to spend it is a change from the ordinary routine of house-work.

Buy Feed in the Fall.—We have also found that it is economy to purchase feed in the fall for winter's use. Bran could be purchased last fall for $12, and in three months it was $16. Now this is a saving of 33 per cent. for three months by purchasing early, or that much loss by waiting. A year ago last fall I bought bran for $10 per ton, and in four months it was $16, a saving of $6 per ton, and the interest (33 cents) for the four months. A merchant, by paying cash saves a small per cent. by so doing, and it is accounted the correct business method, and the one who can't do it can not compete with the one who does, margins in trade being so small; but the farmer who has a chance to save from 33 to 50 per cent., and often more, by buying early, and then grumbles at the hard times, would grumble if he were to be hung.

Ensilage Corn.— Two years ago I planted about one acre of ensilage corn, and thought last year to plant about five; but the pastures began to dry up with no prospect for hay, and I kept planting until I had in twelve acres. I did not tell anyone for fear they would call me a fool. This may seem strange, as I live only two miles from the center from which eminates all dairy intelligence, also headquarters for the ensilage corn, and a truer example of the truth of the scripture which says that, "a prophet is not without honor, save in his own country among his own people," could not be found, and while orders came in for hundreds of bushels from abroad, I was ashamed to say anything about my little patch.

Most of the farmers did not take any stock in "this institute talk." Some of them had farmed it "nigh on to forty years," and they did not want Hoard and John Gould to tell them how to farm it. About July, when it became apparent that the fine field of corn was ensilage corn, even my enemies admitted that for once I had done the proper thing. I began in July and fed 75 cattle and horses, 40 being milch cows, nothing else but bran and a little North Star corn, until January. I had hay enough till April 1st and enough corn to carry me till grass comes. It being equal to tame hay for feed, at prices for hay this winter, it would have taken $500, and where could I have borrowed the money to pay for the hay?

Feeding Corn.— I feed considerable corn to my cows, but do not husk it—just bind and stack it and cut when needed, and in this way save from 12 to 15 cents per bushel over the old way of husking and grinding. I refer to common field corn. The ensilage corn was drawn from shock as needed. It would have been more economical to have placed it in a silo. By running stalks through the cutter, I made them eat up every bit. The cutter and tread power have more than paid for themselves this winter.

I used to pay 40 cents for my 60 lb. tubs and 30 cents for tub staples, but by looking around some I was enabled to get tubs for 25 cents and staples at 14 cents per pound.

I have tried to show that the judicious use of ways and means at the right time is the greatest economy, and that to withhold them results only in loss. We are prodigal in the use of our muscle, but when a problem presents itself which requires mental effort, we shirk from it as a dairy editor from milking cows.

EXHIBITIONS AND PRIZE BUTTER.

By Prof. JAS. W. ROBERTSON, Guelph, Ont.

Ninth Paper.

Value of Exhibitions.—The trend of action and the usefulness of many of the agricultural societies, during the past ten years, has been mainly in the direction of holding fairs or exhibitions. Some writers and speakers have been severe in their censure of the responsible directors for permitting or encouraging that *one aspect* of all the work, ostensibly undertaken by these societies, to so effectually monopolize their funds and energies. On the other hand, it should be recognized and remembered that the stimulus of healthy, hearty and friendly competition which they have fostered has been very beneficial.

Every department of farm work, even on the farms whose tillers are most remote from educational influences, has felt the quickened pulsations of life from the intensified circulation of knowledge resultant from exhibitions. Few farms are now isolated from such aid by reason of their geographical location; but many are still out of reach, because of the sad, secluded mental attitude of the men and women who live on them. If a man or woman, a boy or girl, can be enlivened into a fair competition with others of their fellows in any branch of their work, a great economic boon will have come into their lives. In this I see a bond of union between the *purpose* of Farmers' Institutes in their work of informing, instructing and educating those engaged in agricultural pursuits, and the *plans* of agricultural societies in providing exhibitions for comparing attainments through open competition.

Preparing for Exhibitions.—The work of preparing for the summer and autumn exhibitions will be engaging the thoughts and hands of many farmers' households by the time the readers of your bulletin see this. I could wish that such an interest were more general and intelligent. The cattle and horses of those intending to show will be specially "fitted up," which unfortunately too often means the "breaking down" of excellent qualities by excessive fattening.

How to Make Prize Butter.—Roots and fruit for display will have befitting care and concern bestowed upon them. The boys hardly in their teens will be doing their share of the bragging about the colt, the calf or the lamb, and already in the innocent glee of boyish greediness, fingering in imagination a red ticket for each animal. The girls *not yet* in their teens will be interested in everything generally, with all the young girl's wonderful capacity of expectation; while the daughters *not now* in their teens will be—well I won't leave my ignorance open to caustic criticism by trying to guess what they'll be doing. However, in the anticipation of the same—the exhibitions, not the criticisms—I will try, with all due modesty, to give those of them or their mothers who may be thinking of how nice it would be to take the first prize on butter at one of these exhibitions, some helpful information on how to do it.

Rule I.—See that the cows have an abundance of good wholesome feed. Supplement the grass with bran or grain. Corn and peas make firm butter. If grass be dry or scarce, furnish green fodder besides. The quality of the feed determines to some extent the quality of the fat globules in the milk. Fine butter is mostly composed of these globules. Green fodder is fed with better effect on the quality of the butter after being *wilted* for a day or two. This is especially the case with clover.

Rule II.—See that the cows have a liberal supply of pure cold water. As well might a cook expect to make good palatable porridge out of musty oatmeal and stagnant water, as to get pure, sweet-flavored, wholesome milk out of musty feed and foul drink consumed by a cow.

Rule III.—See that the cows have access to salt every day. They know best when to help themselves.

Rule IV.—If there be not sufficient shade in the pasture-field, the cows should be tied up in a darkened stable during the heat of the hot days. I believe in soiling.

Rule V.—Let the cows be saved from annoyance and worry. Any harsh treatment that excites a cow lessens the quantity and injures the quality of her yield.

Rule VI.—Where practicable, let the cows be milked regularly as to time and by the same person.

Rule VII.—The udders should be well brushed and then rubbed with a damp, coarse towel before milking.

Rule VIII.—All milk should be carefully strained immediately after the milking is completed.

Rule IX.—Thorough airing of the milk for a few minutes by dipping, pouring or stirring will improve the flavor of the butter.

Rule X.—When set for the rising of the cream, milk should be at a temperture above 90° Fahr.

Rule XI.—When shallow, open pans are used for setting, it is most important that the surrounding air be pure. A damp musty-smelling cellar is not a fit place for milk.

Rule XII.—When deep-setting pails are used, the water in the tank should be kept below or as near 45° as possible.

Rule XIII.—The skimming should not be delayed longer than 24 hours.

Rule XIV.—Cream should invariably be removed from the milk before it is sour.

Rule XV.—The cream for each churning should be gathered into one vessel and kept cool and sweet. A good practice is to mix 25 per cent. of pure water with the cream.

Rule XVI.—The whole of the cream should be well stirred every time fresh cream is added, and half a dozen times a day besides.

Rule XVII.—Two days before the churning is to be done, about a quart of cream for every four pailfuls to be churned (or two per cent.) should be set apart and kept as warm as 70° Fahr.

Rule XVIII.—Then one day before the churning, that small quantity of cream — (a fermentation starter which then will be sour enough)—should be added to the whole of the cream intended for churning and well mixed therewith.

Rule XIX.—The cream should afterwards be kept at a temperature of 60° Fahr.

Rule XX.—During summer the best churning temperature is 57° or 58°. During late fall or winter 62° to 64° are found to be better.

Rule XXI.—The agitation of churning

should be kept up till the butter comes into particles rather larger than clover seed.

Rule XXII.—The buttermilk should then be drawn off and pure water at 55° added in its place.

Rule XXIII.—By churning this for a few minutes the butter will be washed in the churn in its granular state.

Rule XXIV.—The milky water may then be drawn and replaced by a weak brine at the same temperature viz: 55°

Rule XXV.—After a minute's churning the butter may be removed from the churn and pressed for salting.

Rule XXVI.—Pure salt of medium fineness and with a body velvety to the touch should be used.

Rule XXVII.—Three-quarters of an ounce to the pound will be the right quantity for most markets and judges.

RuleXXVIII. —The butter should be kept cool during the working, and also during the few hours while it may be left for the salt to thoroughly dissolve

Rule XXIX.—As soon as the salt is thoroughly dissolved, the butter may be worked the second time to correct any streakiness which the first mixing of salt may have caused.

Rule XXX.—It should then be put up neatly and tastefully, with as *little* crimping or beautifying as feminine fondness for these will permit.

Rule XXXI.—It will then do its maker credit and if it does not receive the first prize, it will be prized and praised by its eaters.

Hints on Winter Dairying.

The following letter from Mr. L. N. Brown, Gurnee, Ill., which contains some good suggestions, was read at the closing institute, Mr. Brown being unable to be present:

Winter dairying, I think, could and should be much improved. There are but few winter dairies in Northern Illinois and Southern Wisconsin that more than pay expenses.

I will make one suggestion. Let your meeting chose a dairyman who has all his cows fresh in milk next November. Let them be divided so that each half shall be of the same milking quality. Keep one-half in every respect as the average dairyman keeps his cows. Let the other half be kept in a warm stable. As the weather grows cold the stable should be heated with artificial heat and kept between 55 and 65 degrees. Do not let the cows leave the stable. Water them with water at 98 degrees; keep a true account of all feed and expenses for 90 days, and then see how the profit of each lot will compare.

Or try this way: Give each half the same amount of hay. Give the half kept in the warm stable just grain enough so the product will equal that of the others; then see if it will require over half the grain. I am satisfied that one-half the grain that is fed to winter milch cows is used up by cold. Cold is about as injurious to milk as frost is to corn.

Now, if your people will choose a dairyman who will try this experiment, try it fairly, and have the trial made public from week to week, it will do more to improve the dairies of this section than any one thing that I can name.

There are two faults with many dairymen of this section. First, the dairyman don't make dairying his business. Second, many of them don't do as well as they know how.

If every sober, industrious man will manage his dairy as I have mentioned, his note will be worth one hundred cents on the dollar.

In my forty years of dairy life, I have done much poor dairying; but I am now taking a wiser and better course.

EVENING SESSION—MARCH 29.

FARMERS AS BUSINESS MEN AND CITIZENS.

By Hon. H. C. ADAMS, Madison, Wis.

First Paper.

Hon. HIRAM SMITH in the Chair:

Man and the World's Work.—The business which a man has is not simply his means of getting a living, but is his part of the world's work. Each human life is a tack, a nail, a spike, a cog, a bolt, a lever, a walking beam or a band of steel in the inter-dependent machinery of the world's business. Only when all the parts are perfect will we be able to dispense with that costly governor called government. It is the business of the State to look after the business of its citizens that it may have less business to do. When labor and thought are linked together in every phase of our industrial life, we shall have less grit in the machine and more gold in its product.

A business man, unless misnamed, is thoughtful, methodical, persistent, industrious, ambitious, and above all things, honest. He understands thoroughly the fact that coiled up in his head is the mainspring of his business. He will run in a rut as long as anybody while it pays, but when it fails to pay out he goes, if it loosens every screw in the machine. He is neither morbidly courageous nor superstitiously cautious. He is a man who has reason, and out of it gets reasons. Sink or swim, he plants his feet on his judgment and stays there. Many men in business have only a few of the symptoms of being business men—hence, failures innumerable along all the lines of trade and commerce, in the professions, on the farm, in the domain of art and poetry where men think that the eagles of their imagination can lift them above the laws that underlie success in the winning of bank accounts and of homes.

The World Thirsty for Money.—The world is hungry and thirsty after money. It likes the men who get what it likes. The modern hero is shod with a business suit. The coat of mail has gone to the museums. The tyrants of to-day shed blood under the forms of laws and in the white light and with the *sanction* of a christian civilization. Their palaces of trade should be corniced with grinning skulls and their chambers of commerce frescoed with broken hearts. The love of money is the root of some evil and much good. It is drawing the love of war from the minds of men; it is tying nations together with chains of gold; it has stimulated invention and lessened the burdens of labor; it has peopled this continent, builded its cities and made its country homes. It is an honorable love, and no man need be ashamed of it.

There is no essential virtue in poverty. The strong man poor is a giant in chains; the strong man rich is a giant free to do the world's work and his own. Poverty brings bent bodies and warped minds; it causes more divorces and more heartburnings, more suicides and more murders, more hatred of men, society, government and God than all of the jingling curses that rattle about the heels of wealth. We want less poverty and more wealth on the farms of this country. We want a condition of things where the American farmer can save more and spend more We want him to have the luxury of time, of rest, of recreation, of social enjoyments, of literature of those beauties of art which in the homes of any people shape in a degree both the souls and bodies of their children. These things can be obtained for money. Money can be obtained on the farms as elsewhere by good business men. It is idle bosh to say, as men do say, that little or no money can be made in legitimate farming in this State; that farmers as a class are losing ground. The first part of the statement is disproved by the success of hundreds of farmers in all our agricultural counties, from Hiram Smith in Sheboygan to A. O. Fox of Dane; from A. A. Arnold in Trempeauleau to Chas Miller of Rock; from J. M. Smith in Brown to T. J. VanMatre of Iowa; from John Linse in La Crosse to H. S. Weeks of Waukesha; and from examples in every country neighborhood in Wisconsin, where men are becoming independent from the profits of their farms.

HON. H. C. ADAMS.[*]

Farmers Not Growing Poorer.—It is not true that farmers as a class are growing poorer. The prosperity of any class is safely indicated by the appearance of their homes. Go anywhere in this State to-day in rural neighborhoods and you see better fences, cleaner fields, more ornamental trees and shrubs, broader barns better painted, more tasteful and commodious houses than you saw ten years ago. We raise just as much wheat per acre as we did then, and can buy more things with the money we get for it. We are making more butter per cow, more meat per steer, more pork per hog in the same time than we were then.

Lessons for the Farmer to Learn.—The Wisconsin farmer is a better business man than he was ten years ago, but he has many lessons yet to learn of the sharp men who run railroads, factories, stores and banks. He must understand the value and character of credit, and not be superstitious about debt. An endless amount of twaddle is preached about the horrors of debt. Some capitalists carry a placard in one hand saying do not run in debt while with the other they slap a mortgage upon every man who comes within their reach. The agricultural press dribbles homilies about going in debt from January to December, while nine out of ten of these very papers would not have been born at all if it had not been for a debt. Lecturers upon farm topics invariably season their remarks with sage injunctions about avoiding debt as a plague. Any gathering of farmers will cheer a man to the echo who can pile up a good rhetorical climax of denunciation of the practice of buying more than can be paid for. And yet there is not one farmer in one hundred in Wisconsin to-day who did not get his first title to a home through a debt. They are men who came here with a capital of ambition and industry, ran in debt for their farms, took their risks like men and fought their way out to independence and comfort. It is not business-like for these men to "scorn the base degrees whereby they did ascend." It was a long and bitter struggle for many of them, but the fight was not against debt—it was against poverty. The business farmer should look upon credit as a part of his assets; as something to be drawn upon when profit seems probable. Debts differ. To go in debt for productive property is one thing; to go in debt for unproductive property is quite another thing. To buy land for less than it is worth, to buy stock which can be fed or sold at a profit, to hire labor needed to make or save crops, to buy machines that save expense, to buy fertilizers to maintain fertility of soil—these things make business-like debts, debts that are the eggs of profit. But for the farmer to run in debt for fast horses and costly buildings, for stock that he does not understand; for enterprises outside his business over which he has no control; for costly apparel and furniture for his family that they may move in social circles which regard these things only—these are unbusinesslike debts and are the eggs from which are hatched failure and dishonor. When credit is to be used, let it be in a straightforward way. Floating debts and store debts are abominations. The farmer who forces a merchant to carry him deserves a rough ride and generally gets it. Banks are made to loan money. The farmer has no business to force the men with whom he deals to borrow money because he does not pay it. Let him get his money where they make a business of loaning it, clean up his scattered accounts and then redeem his paper promptly on time though the heavens fall. Men then look upon him with respect. What is better, he can look at himself with respect.

---

[*] Hon. H. C. Adams was born in Verona, Oneida County, N. Y., November 28, 1850, and came with his parents to Wisconsin in 1851, settling at Ft. Atkinson. In 1855 he removed to Beaver Dam and thence to Madison, his present home, in 1857. He received a partial collegiate education at the University of Wisconsin; was elected member of assembly for 1883-4, and re-elected for 1885-6.

Mr. Adams is a farmer, living on his farm adjoining the city limits of Madison, where he owns a dairy and small fruit business; has been in the institute work since its inaugeration, and is President of the Wisconsin Dairymen's Association.

A Debt to Folly.—A farmer can contrive one debt which never can be paid. It is a debt to folly, to be foreclosed by misery and disappointment every day of his life; a debt which will eat out his heart and scorch his soul; a debt which is incurred when his judgment goes into bankruptcy and he goes into the business of farming in opposition to his own tastes and inclinations. It is hard enough to win success in any calling when the whole bent of a man's mind is in the direction of his business. It is doubly hard when the mental drift is the wrong way. It is like scaling a rock feet foremost. Dean Swift well said: "No man ever made an ill figure who understood his own talents, or a good one who mistook them," and Sydney Smith gave the idea a little more emphasis when he wrote: "Be what nature intended you for and you will succeed—be anything else and you will be ten thousand times worse than nothing." The only difficulty with this kind of wisdom is that it does not apply to that very large and unfortunate class of men who have no special bias for any particular pursuit, and drift into the different channels of human activity upon chance currents. For these men there is this consolation on a farm: They are there more completely masters of their own fate than in any other line of business. Cyclones and drouths may come, but they do not as a rule—they are exceptional, and the last has been a blessing rather than a curse to the business farmers of the Northwest. Whether a man has a predisposition for farming or not, he will develop a preferance for certain branches of the business as he continues in it. Those tendencies should be followed religiously. They will make the farmer a specialist perhaps. It is to be hoped they will.

Specialties.— The specialist understands one sound principle of business at least—it is easier to ride one horse than two; a rifle is a better weapon than a shotgun; the point of a needle can be driven deeper than the head of a stick; a burning ounce of oil makes a gallon of water warm, a quart simmer and a pint boil. Men are dropping into specialties everywhere as the world becomes older, richer and smarter. Years ago men could be found who made watches entire, or a whole pair of boots, or a carriage from bolts to cushions. Go into the great factories now. You see men who do nothing but sharpen tools for others to use; who do nothing but drive rivets; who do nothing but rub spokes year after year; who, upon a simple trifling act, constantly repeated, spend the energies of a lifetime. The general-purpose man who can do everything goes down before the deadly competition of the man who can do one thing.

In Law.—The drift is in the same way in the professions. Lawyers are labeled railroad lawyers, criminal lawyers, divorce lawyers and advertise themselves as specialists in the laws of inheritance, in commercial law and in all the branches of legal business. They are paid, not for running tilts on all sorts of horses in every direction, but for a trained effort in one direction.

In Medicine.—The same thing is true in medicine. If all the good doctors are not specialists, to a man they would prefer to be. They know enough to know that the intricacies and variations of the human organs, and the laws that underlie health are too vast for any one mind. They may be general practitioners, but they send very bad eyes to the occulist and useless ears in the same direction. The complicated case of nervous derangement goes to the man who treats nothing but diseases of the nerves. The specialist in medicine runs from the corn doctor to the dismal creature who claims to know all the mysteries of the human heart. These things are so because the world wants better service and is willing to pay for it.

On the Farm. —What is true elsewhere in this line is true on the farm. Concentration of purpose and of talent is as important there as anywhere. It is urged in objection that remarkable talents are needed to run specialties on the farm; that the average farmer does not know enough to be successful in this way. Is not the objection a poison to itself? Does it require as remarkable talents to do one thing as to do half a dozen? Does it require more capacity to be a dairyman, or a fruit-grower, or a beef-producer, or a raiser of swine, than to represent successfully all four interests in one? Can one of the parts be greater than the whole? If so mathematics and common sense should be tied up together and plowed under. The farmer ordinarily makes the most out of that part of his farm work which he likes the best. Why should he not conform himself to that part? Drudgery and mental friction make men old when they might be young. They curse the man who is afraid to follow his own tastes.

The farmer should have the business sagacity to see that when these things are at the maximum a strong partnership is formed between grey hair and empty pocketbooks. Farmers have plenty of talent—more than they think, more than other classes suppose them to have—but very few are broad enough and deep enough to properly manage all branches of farming.

Faith and Enthusiasm.—Men have made money at mixed farming. They make money in Mexico to-day plowing with a stick. It proves nothing. The specialist has almost invariably that most vital quality of a good business man—enthusiasm—an enthusiasm born of faith. Faith may be a good thing in religion; it is a ten times better thing in business, cynics and "I told you so" people to the contrary notwithstanding. The man who enters into his work on the farm with enthusiasm has a place there. Communities respect men who believe in what they do. The namby-pamby dawdlers who stalk up and down the streets of cities and in country places sneering at enthusiasm, and ridiculing the ardor of men who love their work are the "sheeted dead who squeak and gibber" in our modern life. They are not business men.

Men Who Attract Attention.—The men whose thought and work are attracting the most attention from the agricultural minds of the country are specialists. The mixed farmers of Wisconsin, while objecting to specialties in farming, are glad to receive special instructions from Prof. A. J. Cook, of Michigan, about bees, from Charles F. Hamilton about blackberries, from Theo. Louis and Geo. Wylie about swine, from J. M. True and H. D. McKinney about horses, from J. C. Kiser and George Harding about cattle, from F. C. Curtis, Hiram Smith and John Gould about dairying, and from W. D. Hoard about his splendid exposition of the principles of breeding, which has made the modern dairy cow. These men are all specialists. They have left no half-turned furrows over every lead which can be struck upon the farm, but have worked each his own vein and uncovered a great richness of knowledge himself. The Wisconsin farmer will be a better business man when he gives up his mission of trying to raise everything; when, to use a homely and well-chewed figure, he is contented to bite off what he can chew.

Important Tools.—The first tools which a business farmer needs are a pencil and paper. The farmer who grows a crop should estimate the cost as carefully as the architect who plans a building counts its cost. It is farmer-like to guess, it is business-like to know. Thinking and figuring are deadly enemies of failure on the farm. Crops should be raised not as the result of jerky impulse but of careful calculation. A cash account should be kept as rigidly as the the sabbath day. What kind of business is that which cannot be introduced to its outgoes and income at the end of the year. Nine-tenths of the farmers of the country ought to take lessons in the matter of peanut stands and millinery shops. Many of them say that they are afraid to look a cash account in the face. It is a singular modesty which shrinks from bare figures. The business farmer will charge his cash account with every cent expended. If his expenses for tobacco or cigars are such that his wife can make odious comparisons between his financial investment in smoke and in dry goods, make the charge to charity, for it is a charity to a man who is so poor in resources of enjoyment that he must smoke to be happy, to buy his cigars. I charge mine to charity. At the close of each month or year accounts should be drawn off and classified in a ledger under proper heads.

What Keeping Accounts Shows.—The farmer will then know exactly where his money comes from; he will not be obliged to pay bills twice; he will know what he has paid for clothing, for household expenses, for repairs and for improvements; for machinery, for labor, for seeds and plants; for stock, for the education of himself and family and the adornment of his home. If he is financially sick, he can tell what part brought on disease.

How to Spend Money.—The man who keeps a cash account thinks twice when he spends money. Robert Ingersoll has been cheered all over the United States because he said that if he had but a dollar to spend he would spend it like a king and not like a beggar. The antithesis is striking; the idea is as beautiful and as hollow as a soap bubble. The average business man is neither a king nor a beggar. He should ape neither the magnificent spendthrift airs of a monarch, whose bills are paid by the people, or the close-fisted wolfish manners of a beggar, whose bills the people pay. The American farmer gets money by hard work and hard thinking, and if he is a good business man he will spend thoughtfully what he gets laboriously.

Farmers Extravagant. — Farmers are extravagant. They are as a class wasteful not of their money but of their time; of their energies of mind and body. Mental and physical strength and vital force furnish the most productive capital a business man can have. It is a kind of wealth which cannot be stolen but may be thrown away. That eight hour system on the farm which has been described as meaning eight hours work in the forenoon and eight in the afternoon makes small men and dead men; it makes women as narrow as their sisters who do no work; it makes boys and girls who look upon farms as graveyards of comfort. The farmer in ordinary circumstances should work and work hard with his hands. The flippant contempt for manual labor which lurks in otherwise vacant places in society should have no sympathy from him. But when all his force is used in muscular action, he robs his brain. He squanders the splendid chance which each man has of mental growth. The farmer in his business is dealing with all the laws which have statement and definition in natural science; he is dealing with not only the complications of those laws which make plants and animals but he is dealing with men, men who have minds sharpened in the keen contests of business life and broadened by the culture of schools and society. He cannot afford to measure himself by the standard of muscle, for in that case he must stand uncovered in the presence of that historic animal which spoke to Baalam.

Thinking Saves Working.—Thinking saves working. The thought of the race worked out in the application of steam to machinery is said to be doing each year the labor of 1,000,000,000 of workingmen.

The farmer who is a business man will never call anything "good enough" which can be bettered; he will have that splendid discontent which is looking and working for better soils, better crops, better stock, better buildings, stronger sense and more perfect character. On the other hand he will accept the inevitable, with the grace of that old woman who said that although she had only two teeth, she thanked God they were opposite each other.

Farmers in Politics—Every American voter should be a politician in the best sense. Our political system suffers because the business men of cities are timid and the business men of the country indifferent. The political bully weighs too much in municipalties. His country cousin, with better manners and a sleepless activity, has a wide-spread influence. The obligations of citizenship should make every farmer active in politics, not for the good of his class alone, but for the good of his country. It is not good citizenship for a farmer to neglect the primaries of his party and then growl about nominations; to keep away from the polls for lack of time to vote, and then spend days in the post-office or corner grocery bewailing the result of the elections. Good citizenship means an interest in, a knowledge of, and a devotion to the general welfare. With the farmer it means good work in the road district, and active thought and work to make township, county, State and national governments what in his best judgment they should be. He may be beaten by men of less brain and microscopic moral sense, but he is fighting under the American flag and for it, and he should surrender to neither fools nor rascals, though routed a thousand times. Men say they do not like to meddle in politics because the atmosphere of political life is full of moral poison. Why do they not stop business because of the tricks of trade, and the dishonesty of some business men? Why do they not forswear society because it does frequent honor to hollow hearts and hollow heads, when balanced with well-filled pocket books? Will the political atmosphere become purer by the absence of good men?

The men in this country who are too dainty to help govern themselves ought to pay taxes in Turkey and get justice in Russian courts. Certainly they should disguise their cowardice or laziness with thicker garments than professions of their own superior virtues.

Dignity of Labor.—The farmer who is a good citizen will never be oppressed with that nightmare of nonsense which pictures the tiller of the soil as carrying all the burdens of the world. A good citizen respects the rights and virtues of all classes and does not magnify those of his own. There is no more essential nobility about the business of working land than making chairs or cutting off limbs. There is as much dignity in driving a shoe peg as in hoeing a beet; just as much virtue in selling a railroad ticket as a strawberry.

Not one farmer in one hundred has as hard and laborious a life as a railway president of an average, first-class road. There is no dignity conferred by unthinking labor. Thoughtfulness and wisdom dignify all labor, whether of farm, factory or law office. A political party devoted to farmers' interests alone would be an abomination. Strong, moneyed interests have too great power in State and national legislatures; but a remedy which would set one class in opposition to all others would be worse than the disease. It is not farmers that we want in public life so much as men. It should be no reason that a man should be elected to this or that office because he is or is not a farmer. The old question—is he capable and honest?—should stand until the end of time as the only test. Manhood should stand above vocation. It is more important to know whether a man has brain or not than it is to know whether he pays taxes in a town or out of it. When farmers bring a strong intellectual life into their citizenship their interests will be taken care of. They will never climb to a political heaven upon bubbles of bombast about their own superior virtues, or get any higher by pulling down other classes.

Justice to Public Men. — Farmers as a class will be better citizens when they do justice to public men. It is considered a proper thing in almost any gathering of farmers to speak of public officers as dishonest. This sentiment is contaminating all classes of people in the United States. We meet it everywhere. Every woman who reads an essay, talks glibly about the awful corruptions of the puplic service; the newspapers are filled with squibs and editorials aimed to unsettle belief in the integrity of officials. Rumors of corruption hover over every movement in legislation and government. The extent of this sentiment in the country is almost beyond belief. And yet there is not one *iota* of evidence to prove that the republicans and democrats who hold office in the United States to-day are not as honest and conscientious as the average farmer himself. They are not all honest, it is true, and a prismatic partisan press gets all colors from their acts, but as a class they represent a proper idea of what integrity in the public service means. If there is anything which will tend to make officials corrupt it is the continued insistance of the people that they are so.

Love Your Vocation.—The farmer who would represent that which is best in business and citizenship should love his vocation; he should carry into it enthusiasm and persistence; he should have knowledge; he should know men and things; he should be broad in his charity, strong in his friendly sympathies for other men and other classes; he should be loyal to himself, loyal to his class, loyal to his country, and, above all, loyal to the truth.

Tribute to Wisconsin.— This commonwealth of Wisconsin, with its laws, its schools, its institutions, its mills, its factories, its mines, its forests, its millions of cultivated acres, its populous cities, its happy homes, where children learn the lesson of labor and of love, its wealth of matter and its wealth of mind, is a splendid monument to the business ability and the citizenship of those men who, in an early day, came here to build for themselves homes in the Western wilderness. We should hold this splendid heritage and make it grander still with unselfish labor and a patriotism which shall do honor to their memory and lead our children to do honor to ours.

INDUSTRIAL EDUCATION FOR OUR GIRLS.

By Mrs. L. B. C. **GAULT, Waukesha County, Wis.**

Second Paper.

Our Work To-Day.—To live in the present age is to bear the burden of a great responsibility. All nature is instinct with progress, and humanity is struggling to outgrow the barbarisms of the past, and win its way to that higher and more complete development toward which the spirit of the age is beckoning. Our work to-day is different from that of ages past, for an advancing civilization has opened new fields for beneficent enterprise, besides awakening philanthropy. As our race climbs upward to a higher plane of thought and action, the imperfections of the past become more clearly discernible, and what then was all-sufficient is now out-grown, and the surest index of the true altitude to which civilization has attained, is the condition of its physically weaker half. A glance at the life of any nation is sufficient to reveal whether it still cherishes the barbaric belief that "might makes right," or has achieved that loftier eminence from which men become "soft to the weak, and noble to the strong," and regardless of the needs of all classes and conditions of society.

Ignorance and Inefficiency.—Penury, the child of ignorance and inefficiency, drives multitudes into paths of misery and vice, and thousands of blighted lives, to-day, offer up a dumb, pathetic protest against the civilization which savors so strongly of barbarism. It is needless to deny this truth, for relentless facts stare us in the face on every hand. In vain shall any seek to extenuate the matter—it admits of no extenuation. It is useless to plead ignorance, for where "knowledge is a duty, ignorance is a sin;" and so it becomes incumbent upon every intelligent man and woman to study into the cause and then apply the remedy to this evil. We are told that ignorance is the root of all evil. It is true.

It is equally true that to remove any evil, we must strike at its root and exterminate that. We find, on examination, that there is ignorance and ignorance, and that while the evil of one hundred years ago was ignorance of the head, the evil of to-day is ignorance of the hands; for "Satan finds some mischief still for idle hands to do." A system of education which develops merely the brain and admits the all-important training of the hands to some useful, self-supporting industry, is woefully defective; is, in short, of that kind against which we have been warned, as the "little learning which is a dangerous thing." It endangers individuals, homes and society.

A Harmful Theory.—There is a harmful theory, deeply implanted throughout the social world, which, having ignorance for its root, deserves extermination, and the sooner the better—a theory that "all men support all women," starting from the dangerous (because false) assumption that all girls will marry, and marry well, and that, therefore, the only education necessary for them is the acquirement of those accomplishments which will enable them to entertain well, dress fashionably, and conduct their household affairs tolerably well. The practical application of this time-honored theory proves disastrous, both to individuals and to society. False promises can not lead to true or safe conclusions. Many women never marry; many who do are deserted or divorced; many have incompetent or dissolute husbands, and many are left widows. Untrained to any industry, ignorant of the practical means of self-support, they drift aimlessly and miserably along, fearing the future, for which they are powerless to provide. What wonder that thousands are swept down into the whirlpool of destruction by the strong, resistless tide of circumstances!

How Our Girls Are Equipped.—How is our army of young girls armed and equipped for the battle of life? Forced to the front in a hand-to-hand conflict with fate, with no munitions of war, nor an hour's drill to prepare them for active service; with a smattering of many things. and a practical knowledge of none; pushed aside or "trod 'neath the hoofs of the swinish multitude;" forced to fight for their bread, and from lack of training in the higher, more renumerative, branches of industry, driven down into the drudgery of the lower, with its heavy work and poor pay, until talent, ambition and hope are dead, and they themselves are consigned to the grave of oblivion, or to even the worse and more pitiless fate of becoming the living monuments of their own irreclaimable loss and shame! No memorial days, no bands with dirge-like music, no flags at half-mast, nor floral offerings for them! There is nothing heroic about their martyrdom, and the world "passes by on the other side," with a feeling of wonder mingled with its contempt at their failure to fulfill the promise of their earlier years, "for they were bright girls at school, and graduated with honors." Find, if you can, a more cruel cavalry, on which innocence is crucified! Is not here a great and "unpardonable sin" of omission?

Controlling Circumstances.—If circumstances control men, so may men control circumstances, and while exists one slave to any circumstance which might be controlled and we neglect to do it, we are closely akin to him who cried, in days of old, "am I my brother's keeper?" If we cannot conquer single handed, we must unite our forces, and organize our effort until order is established with man as master, circumstance as slave. Much has been accomplished but more remains to be done.

Training Girls for Work.—During woman's long march through the narrow fields of a few industries, she became so proficient in them, that the world fell into the natural error, perhaps, of believing that she required no farther lessons nor review of them; that they were a sort of second nature to her. And so, when wider possibilities opened before her, the work of her hands dropped from her education, and the schools alone recognized her need of mental training, thus fitting her only for the professions, which, consequently, have become largely overcrowded, leaving hundreds idle who would otherwise be employed, while those who are naturally gifted for professional lives are underpaid, because of the excessive supply of cheap labor. This is wrong. Each child should be trained at school, to that work for which he is by nature adapted. One great secret of the numbers of idlers among our young, is that they have never been placed at their own work, but have been expected to do that which was designed for another. Our greatest teacher tells us that there is a "diversity of gifts." A child that is hopelessly dull in one branch of study may be a genius in another. Caroline Herschel, though she could never learn the multiplication table, and always carried a copy for reference in case of need, became the accomplished co-worker of her brother in his world-renowned astronomical observations, and was, herself, the discoverer of eight comets. It should be the aim of all educators to first ascertain the particular work for which each child is gifted, and next to educate it in reference to that work, and train it to do it well. How much of misdirected effort, with its consequent failure, discouragement and loss, would thus be averted! "The labor we delight in, physics pain," sang the immortal bard. When each soul shall be free and fitted to follow the labor it delights in, what a golden age of accomplishment, and consequent happiness, will be inaugerated!

Training Schools.—Our government is now establishing industrial training schools among the Indians. That is well; one step leads to another, and may the good work go on until not a child of any nationality will be graduated from our schools without being armed and equipped with the practical knowledge necessary to win success! With all its children trained to the various trades, professions, arts and industries, our nation could no longer fail to recognize its need of opening new fields of industry. We should not, at this advanced stage of our prosperity as a nation, be longer compelled to import skilled labor, or export raw material in order that it may receive the form and finish which gives it market value.

Need of Skilled Labor.—The need of skilled labor in America is rapidly developing into a necessity as the demand for it increases. One writer states that the only cause of failure in co-operative laundries and bakeries which have been started in this country is from our dearth of skilled labor. More and more do thoughtful men and women perceive the deficiency in a system of education which does not bear more directly upon the practical needs of the vast majority of our people. Public education should surely meet the requirements of the public, and consult the greatest good to the greatest number. And there is a growing demand that industrial education be, in some way, engrafted into our public school system—a system which, though admirable in many respects so far as it goes, still involves a vast and needless expenditure of time and money by forcing all who are not to follow the professions to go abroad or enter apprenticeship in order to acquire the most useful and valuable part of their education, viz: The industrial skill necessary for their self-support; and it being impossible for thousands either go abroad or to find suitable apprenticeships, idleness is the result.

Women's Work at the Centennial.—One writer, in speaking of the Woman's department of our Centennial Exposition, says:

> "Everywhere was a vast amount of pretty pettiness, which set forth in unmistakable language, how few and how small have been the methods by which women in the past, have gained a livelihood."

Yet there were signs of promise in many of their exhibits. From various schools of design, the students work gave abundant reason for foretelling a bright future for woman when she shall have wider opportunity. Fine specimens of art and skill were there. Admirable exhibits of *materia medica* gave proof of her ability to compound drugs. Exquisite carving in wood, modelling in clay and in butter proved her artistic skill. Indeed, could woman's work have been gleaned from among that of her employers—and placed by itself in one department—a most interesting feature would have been added to the exposition. But, alas, small space would have been required for the work of our own country-women!

Technical Schools.—Why is this? Are the women of America less gifted, less intelligent or persevering, than are their sisters of the old world? No. In many respects they are superior, and blessed with greater advantages; but America has few schools of design, and fewer technical schools. In Europe both are numerous and excellent, teaching millions of girls and women who study science and art, as practically applied to the industries. This is the secret of their success: Their art schools are established by government, and supported by yearly appropriation. At the South Kensington museum, London, 100,000 students receive free instruction every year in the industrial and fine arts. There are more women than men students, and their success is said to be greater, as the fine work is so fitted to their more refined touch and delicate perception. In the United States no such national provision exists. The want is partly supplied by private benevolence and enterprise, but the vast majority of our students of the fine or industrial arts are forced to go abroad. Can we afford this? To what wiser use could a portion of our vast revenues be devoted than to the practical education of our children?

Manual Training.—The kindergarten method teaches the smallest ones how to use their hands and discriminate forms and colors, and the more difficult and useful manual training should be taught with the correspondingly advancing grades of mental development throughout the entire course of study, until, at the last year of school, the senior class should have gained such mastery over hand and brain as to accomplish separate and difficult feats with both simultaneously. This would give them power to continue study through life, and in a country where the poorest child may be elevated to the highest position is specially needed. It is a false idea that one must be locked in a room with ones books in order to acquire learning, and labor should not be so new and strange as to absorb one's entire thought and attention. Let us profit by such grand examples as that of the earnest student at his forge who used his brains on other problems than what his hands were forming, and of our hero who revolved in his brain the mighty problems of a nation while splitting rails! Elihu Burritt and Abraham Lincoln were marked exceptions of natural power of concentration of thought;but it can be acquired, and its value can never be over-estimated. Train the hands until they perform their tasks mechanically and accurately, not enslaving the mind. A good beginning to this training is the compulsory drawing in many of our schools. Also, a few schools of design have been established here, as well as art schools, cooking schools, schools of wood carving, pottery, sculpture, etc. Our industrial exposition was a great and valuable object lesson, and awakened in many minds a "divine discontent" with our present order of things, demonstrating that we are far behind the older nations in giving that finish to our work which so adds to its beauty and market value

The Economic Standpoint.—One of our New England manufacturers states that the designs used in his factories alone cost forty thousand dollars, every cent of which goes to Europe; and he adds farther that the same designs might have been produced at a cost of less than five thousand dollars, within a mile of his mills, had an art school been maintained there for five years. The proverbial Yankee will disappoint the world, if he fails to catch the drift of that fact, and to make its practical application. But, after all, the economic is the lowest possible standpoint from which to urge this reform. One authority upon this subject says that, as suitable occupations are provided for girls and women, the worst evils which afflict society rapidly diminish. Surely then every mother and every father and philanthropist should labor to supply them.

Duty of Parents.—The old-time prejudices against women's entering the various fields of labor have melted away, one by one, till she now stands within the gates of nearly all. But it is for the masses we plead—for those who have not the strength, courage and ability to surmount the obstacles which still obstruct their way. It certainly is the duty as well as the privilege of parents to tenderly guard and cherish their little ones, and when they begin to walk to remove every danger from before them, and especially to see that they do not wander out into the streets alone.

Duty of the Nation.—As with the individual, so with the nation, and for America to neglect teaching its multitudes of children how to walk or even stand unsupported, while thousands of them must inevitably be forced out into the hurrying, dangerous "highways of life," alone—(or perchance with others even more helpless than themselves to care for)—is to "out-Herod Herod," in a wholesale "massacre of the innocents." But it is sometimes objected: "If the State and nation provide the intellectual training, it is the duty of fathers and mothers to see that their children become self-supporting." Under the old custom when children were expected and compelled to follow the vocation of their father this was practical; but now the child may choose to learn that of which its parents are entirely ignorant, and they might not have the means to import teachers, or send pupils to Europe.

Face the Facts.— Many industries, which, in former days, were considered as belonging exclusively to woman, are now invaded by her brother, and she is obliged to meet with his powerful, and oft-times over-powerful competition. Laundry work, baking, weaving, spining, knitting, butter and cheese making, even millinery and dress making—nearly all occupations that are on a large and paying scale are conducted by men. Not that we complain of this—far from it; but we must face the facts, and adjust ourselves to these new conditions, and see to it that they do not result in that direct evil, enforced idleness to any class. Let other industries be established, with schools of training which shall enable our children to labor in them successfully! Intelligent work drives out drudgery; breaks the chains and sets free the slaves of circumstances, leaving time and strength for other things besides the desperate, unremitting struggle for a bare existence. And the reasonable exercise of all our faculties, mental and spiritual, as well as physical, is essential for their proper and symmetrical development. Says one authority:

> "Nervous diseases of every kind are often caused by too close confinement to a most narrow circle of thought and duty, and here is the explanation of the large proportion of farmers wives in our insane asylums."

Schools to Teach House-keeping.—This brings us to the special need for establishing schools of training in the domestic industries, and for providing all the agitation and light necessary to hasten the evolution of the several distinct spheres of labor now involved in chaos which fills and over-shadows our kitchens. The girl of the period is educated beyond not the work itself, but clumsy methods of doing it are taught, or the barbarous ideas of carrying on four or five separate trades at once; and when she drifts into the farm house as mistress of its present conglomerate house-keeping, she is at once submerged in a chaos which is, indeed, "without form, and void" of light, being filled with the darkness of despair to her unaccustomed vision. Where now shall she look for help? The "other girls" argue, as she herself has lately done, that in the fewer hours, better pay and social privileges of other employments, are more time, means and opportunity for rest and recreation; and their reasoning is full of the unanswerable logic of truth. For, despite the elegant arguments in favor of quiet home-life, healthfulness of country living, with its pure air and water, abundance of milk, fresh vegetables and fruits (all true), still there is a grim skeleton in the closet, which "will not down" nor out, but which drives the girls out of our kitchens into other fields of employment. While other classes of work have their regular hours, the hired girls work is variegated as is that of her mistress, and, like hers, is never done, and instead of having fixed rules, depends too often upon the caprice of her employers or their children.

Social Ostracism.—Socially she is ostracized—a shame, but a fact. The State has much to do with the social ostracism of any class of laborers. So long as any government legalizes moral impurity and sin, and attaches manual training to its penal institutions alone, it degrades labor, and places a premium on vice. Labor is honorable, and should be elevated, not degraded. Vice is dishonorable and should not be made respectable by laws which justify the wicked for reward of license. Even though society blindly cherish that relic of barbarism, the false and pernicious idea that to be a lady one must shun certain classes of honest, useful work, we have a right to expect better statesmanship from the few who are chosen and trusted to legislate for the many. The girl who in a factory, a store, a bakery, or in any other systemized and respectable work, would be called first class help, rebels here at once, and leaves our kitchens to go, perhaps, to the city, too often to follow a life of gilded misery. Or, perhaps, the girl is wholly incompetent, her industrial education having been left entirely to her mother, and that mother a foreigner with little or no idea of American methods of housework; probably spending much of her time and strength in field labor, therefore accustomed to slide through her indoors work with all possible dispatch. With this class of help the unfortunate mistress is reduced to a choice of two evils, and, choosing the least, sends the girl home, much as she needs help, preferring to do her work alone. We all have seen domestics who needed reorganizing. The same is true, alas, of mistresses. But the education and the work itself need it most and first. After that has been accomplished, other difficulties will settle themselves.

Necessity of Manual Training.—Every intelligent woman who is mistress of a home sees the necessity of manual training in the various and diverse departments of labor which surround her, both for herself and for the help she so needs, but which, under existing circumstances, it is so often impossible to secure. And so it is that our army of sweet girl graduates who enter this battle field of labor are at once forced into active service with little or no training or re-enforcements. Amid the dust and smoke of battle, in their war against dirt and disorder, they must also attend to the culinary department, in itself a varied and extended industry, including several separate and distinct branches of labor; to the making and mending of garments; to the laundering, dairying, fruit-picking, canning, preserving and pickling; to the setting and clearing away of tables; the washing, wiping and putting away of dishes, three times a day, for 365 days in the year, and one additional day for every fourth year. And more than all, there come the work, the care, the ceaseless anxiety and responsibility of raising her family of children.

Strength and Brains Needed.—Roasting in the kitchen, chilled in the ice-house or cellar, needed in the nursery, the poor, distracted, despairing mother needs a leviathan for strength, and a Napoleon for brains, to conduct her warfare amid this labyrinth of difficulty and danger.

As the girls with brains are rapidly deserting our kitchen ranks, we must capture our leviathan in the iron harness of steam-propelled machinery, with a few trained keepers to superintend his labors; and the Napoleon who shall lead our despondent army safely through these, narrow, steep and dangerous defiles onward and upward to victory is industrial education, with its more civilized method of warfare—organized co-operation.

TO IMPROVE OUR COUNTRY SOCIAL LIFE.

By Mrs. J. A. CLARK, Jefferson County, Wis.

Third Paper,

Farmers in Town.—I read, not long since, in a Chicago paper, a complaint that social life among the farmers was dying out; and one of the reasons given was that so many of our well-to-do farmers are in the habit, when they have things fixed comfortably and to suit them on the farms, of letting them, and moving to far less pleasant quarters in town. In fact, in every village you can see something like a half dozen men, gentlemen farmers I suppose one should call them, men who own broad acres and homes having every comfort, who have let them to tenants, and now live in some small house, on a back street, industriously doing nothing, and who propose to spend the remainder of their lives in this cheerful occupation.

Country vs. City Life.—I am not blaming these men; they know what they want, and are able to have it. But it seems to me there is something wrong about our social system, to cause such a state of affairs. In other and longer-settled countries than this, life on a farm is considered by far more enjoyable than life in a town. For centuries it has been the ambition of nearly every city-bred Englishman to own some estate in the country, where he could put his foot on his own ground, and enjoy pure country air and existence free from the tumult, din and smoke of city life. From the time of Virgil and Horace to our own Longfellow and Whittier, all poets have sung the joys of country life.

"A little farm, well tilled," writes one. Says another:

"Happy the man whose wish and care,
 A few paternal acres bound,
Content to breathe his native air
 In his own ground."

Men like Webster and Clay, like Jefferson and Washington, delighted in their country homes and spent all their available time there, and physicians all agree that the prospect for health and long life is much more favorable in the country than in the city. Since men so eminent and intelligent unite in considering the country so desirable an abiding place, we should earnestly seek the reason why so many people leave it, for if the best people do leave the business and settle in town, it must necessarily follow—the best going and the poorest staying—that the race of farmers will deteriorate and become an inferior people. The reasoning of Darwin and Herbert Spencer proves this, but we have not come to this yet, and I hope we shall not.

Why Farmers Leave the Farm.—The reason these people do leave the farm is doubtless because of the want of social advantages to be found in the country, which they hope to find in the town, and which they undoubtedly do find to a greater extent.

The Happiest Man.—I will mention two ways in which one family have occasionally relieved the tedium that does at times envelop a farmer's existence, saying first, however, that I do not agree with a remark which I read of Senator Ingalls, where he says "that the happiest man he knows of, is the farmer who has no acquaintances farther away than eight miles from his home," meaning that a farmer's business and friends and life should be centered in his own township. It seems to me that this idea of happiness is as correct as to say that the happiest thing in existence is a fat hog in a pen. There can be no doubt that he is happy, but it is not the kind of happiness we look forward to, especially in a land like ours. This is a beautiful State, embracing a great variety of scenery, with its lovely lakes, its fine forests, its rolling prairies, its rushing rivers, its ridges covered with woods, its valleys waving with grain. In such a country to limit a man to eight miles is to deprive him of much of the best that God has given free.

A Pleasant Ride.—When my husband and I were younger than we are now, it was our custom—after our spring crops were in—each year to take a little ride. People emigrated a good deal in those days, and we used rather to envy them as they went by in their canvass covered wagons. So we rigged a white top on a light wagon, and started out to see the State. We camped, cooked and ate our meals by the roadside, slept in our wagon, and our expenses were trifling. We drove about forty miles a day, and though I expect people wondered to see an emigrant wagon scooting along at a good trot, and also at the various directions we sometimes took, yet we were always used well, and not only obtained a practical knowledge of the geography of our surrounding counties, but in several instances increased the circle of our friends, and after a week's journey came home satisfied that providence had fixed our dwelling in such glorious surroundings.

Wedding Trips.—If any of our young people are contemplating a wedding trip before settling on a farm, I would suggest that they may combine economy (which all young people should take into account) and fun in the novel nature of the conveyance, and seclusion, which newly married people always desire, and instruction in the geography of their immediate neighborhood, in such a journey, to a far greater extent than in the more expensive arrangements that are usually made. If they start about the 1st of June, which is an excellent time, they also will be able, every few miles on their road, to get a realizing sense of the practicability, the excellencies, and the great and glorious common sense in every way displayed in our Wisconsin systems of road-making and repairing. This would make a nice wedding journey, and as each year went by they might repeat it; only perhaps on the next trip they might feel like taking a few friends with them. Do you have any doubt that a party of young farmers and their wives would have a good time on such a journey?

By-and-bye there would be children to take along. I well remember when our wagon-seat made a good spring bed for our boy, and his delight when, in one of our rambles, he caught his first brook trout.

Fishing Excursions.—As our young friends grow older, and perhaps tire of long rides, shorter distances and longer stops could be arranged. This State is full of lovely sheets of water, well filled with fish. Parties think it worth while to come to these lakes from Milwaukee, Chicago and St. Louis, to pay their fare and put themselves to much expense for a few days outing in such charming situations. Why is it that intelligent farmers living within easy distance, with plenty of transportation at comparatively no expense, do not avail themselves of such privilege? Have they worked so hard as to blunt their sense of enjoyment? This is what I fear of our farmers, and it is a danger that should be attended to. Let them try this next season. After the corn is planted, I believe any fairly well-to-do farmer can manage his affairs, so as to be gone a week. Let him arrange a small party, not of his immediate neighbors, if he can do otherwise (he sees enough of them at home) but of those of his acquaintances who are farthest away who are congenial to him. Thus he not only enlarges the number of his friends, but the further advantage in that seeing them seldom, he only sees their good qualities and does not discover their bad ones. Let them take teams and tents and go at least a day's drive from home, to secure a good fishing place, and camp, and fish, and spend one week in a total change of conditions from the usual surroundings, and if they are good fellows—and nobody else ought to go into camp—and their wives are pleasant companions, they will come back rested and refreshed for all the rest of the year, and will look forward with interest and pleasurable anticipations to its renewal the next season.

One not only sees but learns much in such a trip. I remember once asking the road, and a man told us to go to the corner where the school-house stood before it was moved, then turn to the left and go through the woods till within a half mile of old man Jones, then go down to the town line, and pretty soon we would strike the county road and that would take us where we wanted to go. It is needless to say we got there. How many of my readers know and have seen Oil City in this State? Yet it is not only on the map, but a splendid artesian well throwing a 4-inch stream twenty feet high, and one house mark the spot where one patriotic citizen tried to make this state the equal of Pennsylvania.

Not Good to Vegetate.—I have suggested these trips as a way that farmers might profitably and pleasantly spend a week in the summer. We are told that a rolling stone gathers no moss, and my idea is to roll a little moss off some of our farmers; perhaps there are too many moss-backs among them. Most sorts of vegetation are good on the farm, but it is not good for the farmer himself to vegetate; yet there is a tendency that way, and I think it would not be difficult for any one hearing me to bring to mind some farmers, or perhaps some whole family of farmers, who do not live more of a life than their own cattle, if as much.

Saving and Hoarding.—Within my own neighborhood an old man and his wife have lately died. They were childless; they had no near relatives nor any friends to care for; yet all their life was spent in saving and hoarding. They neither had good food nor good clothes; they lived in the worst room of a mean house; although the man was fond of reading, he took no paper; they had no enjoyment except what they derived from knowing they had money, and the constant fear of losing that offset that pleasure.

When they died, they left 80,000, all they had; they didn't take a cent with them, and now three sets of lawyers are dividing it up among themselves. This case reminds me of a man who, when he was a boy, found a piece of money in the road. This gave a turn to his life; ever after he walked with his eyes on the ground, seeking to find other pieces, and while he did at times pick up small sums, yet the beauties of nature—the the sun, sky, the procession of the stars, the clouds, the various colors of the woods and fields were unknown to him. He gained a little money; he lost everything that life is worth living for. It is not the man who has the most acres, nor even he who raises the largest crops that is the most successful farmer; but rather he who, with an active and intelligent mind, a happy and cheerful heart, an industrious and prudent disposition so averages his work and his life, that his labor, and the rewards of his labor, give him means for instruction, recreation and amusement; and these in turn so refresh him that he returns with pleasure to his work. His is a well-balanced life. All work and no play, makes any one dull, and it is *more amusement* that a farmer needs. He rarely, if ever, suffers for work. We need not urge him to work, nor need we hunt up work for him; but if we can suggest anything in the way of fun, we are doing him a good service, and if I can show any way that can add to a farmer's enjoyment, I am willing that others should teach him how to add to his crops.

Winter Amusements.—I have given you my idea of what might be done in summer. I will now offer a suggestion as to how we might improve on social life in the winter. I premise that at this season farmers have plenty of leasure. Our winters lately strike me as being about nine months long, and but few farmers are pressed with work at this time of the year. Granted the leisure, granted intelligent and well-to-do farmers, how can they spend part of their time intellectually, pleasantly and socially? Some one will probably say with a reading club, with a debating society and with the grange. Well these are all right if you can get them to do it. But I never knew a farmer to join a reading club. They prefer to sit by their own fire and read. A debating society runs into tariff and politics, and amuses the ladies but very little. I belong to the grange and enjoy it, particularly the social features of it, and think these might be enlarged to advantage.

Whist Clubs.—But the particular plan which I would suggest would be for intelligent farmers and their wives in any neighborhood to form a whist club. Whist is emphatically a farmer's game. Dependent not upon surprises, it requires of its players a clear, solid intellect, a good memory, quick and accurate observation, a patient attention and ready reasoning powers. It is not only a recreation, but it is a discipline. As an intellectual exercise, it is as powerful and potent to strengthen the mind and exercise the wits as are algebra and geometry, and far more pleasant to take· If a man can by his reasoning learn that it is for his interest in the game to lead up from his long suit rather than from his short one, he is making the same kind of discovery that leads him to make a four years rotation of his crop in preference to the short-sighted, though sometimes for the moment profitable plan, of following wheat or barley with the same crop. In either case he looks and reasons ahead of his immediate surroundings.

Whist Quickens Wit.—We frequently see it stated that while the farmers of Wisconsin are naturally the most intellectual people we have, they do not sufficiently exercise their faculties, and have need to learn to use their brains, and I think whist—a purely intellectual game—would give them this opportunity. It would also make them quicker-witted. We hear farmers say when they have been swindled by the Bohemian oats man, or the lightning rod sharper, or by some other scamp that preys on them, that if they had taken time to think the matter over they never would have done so, the fact being that the farmer, having so much more time than other people for intellectual operations, has given himself a larger allowance of it than the business men do, so that when there comes a sudden call for a quick decision he very frequently arrives at a wrong conclusion, much to his detriment. Now, had these farmers been whist-players—had they, in the various contingencies of the game, been in the habit of being called on for immediate decision in regard to their course of action, they would have acquired a quickness of apprehension, and a readiness of intellect that would have been of profit to them in the emergencies above mentioned. There is a continued call in farmers' lives for greater intellectual activity, and the discipline of whist would supply it.

Recreation for Farmers' Wives.—I read in the last agricultural report that a farmer was never known to get along unless his wife knew something. I mention this here, but what I have said as to whist should not lead the men to go off by themselves and have a game together, for, in my opinion, women are fully entitled to their share of any fun. I waive the question as to whether a man or his wife does the most or the pleasantest work, but under any circumstances the most amusement falls to the man. It is he who goes to town. He can loaf around stores and post office, he can attend elections, and his business relations give some variety to his existence, while for his wife there is simply the treadmill of her daily duties. We continually hear that farmers and farmers wives should read and improve their minds. Perhaps they ought, but one thing a farmer's wife needs. A woman shut up all day with an enless and unvarying round of labor—whose whole life is a narrow routine the limit of whose horizon is the back kitchen yard, and the extent of whose travels is the wood pile and the well—this woman I say needs recreation and amusement, and any plan of a farmers' whist-club that does not take her in as an equal partner is defective from its foundation. So here we have the material for our club. Two families can comprise it, though the more there are the better, and the more sociable the management. Of course they meet alternately in one or the other's house, and even if several families belong it is not necessary for more than two to get together at once; this, probably, is the better way, thus giving more opportunities for meetings.

There should always be some refreshment. Farmers who raise so much are the last people in the world who ought to go hungry. For the oysters are always good, and fried oysters are better than stewed, but they are comparatively expensive, and I believe that, as a rule, it is best to provide things as much as possible out of our own produce and above all things would mention against a too extravagant lay-out. We had at one place a little whist club, that was broken up I think because each lady felt it necessary to her reputation to go a little ahead of the one before. So that one little lunch ended in an extravagant spread and exhausted all our resources. Bread and butter and cold chicken, a turkey, or, if one knows how to make it, chicken salad (I do not think salads are quite as well known as they ought to be among our farmers), a cold tongue, broiled ham, spare-rib or corn beef neatly sliced (only one kind of meat at a time, of course), with coffee or cider, would make a perfectly satisfactory sort of a lunch for any kind of a farmer, as it would be a pretty poor farm-house where these things could not easily be set out, and a farmer always has one great advantage that occasionally fails a city man—he has a good appetite. I would allow one, and only one, kind of plain cake, and some sauce or jelley for a finish.

Work and Expense.—There is but litttle work in such a repast, and but little expense. A very nice wine jelly can be made by using Cox patent gelatine, at a cost of but little over 10 cents a quart, of course using home-made wine and not counting that in the price. Currant wine gives a better flavor to sauces and jellies than any you can buy.

Books on Whist.—Now if I have persuaded any one that he wants to play whist, let me say something as to the game. The St. Paul Railroad last year issued a little book for beginners which I am pleased to say was written by a lady, and distributed free by the passenger department of the road. This book gives one some idea of the fundamental principles and value of modern whist, and if one should obtain it and study them, it might have a tendency to lesson in some degree our feeling of hostility toward a corporation which charges about as much for carrying a bushel of grain from Madison, as it does from St. Paul.

When the book is mastered, if the beginner wishes to learn the fuller development of the game, and the finer touches of scientific whist, I would refer him to the works of such authorities as Cavendish, Pole or Proctor, all of which are excellent, and there is no reason in the world why farmers should not master them.

Time Not Wasted on Whist.—We see in the papers accounts of the whist clubs of Milwaukee, Oshkosh, Chicago and other places. The members of these clubs are among the best and most prosperous people in these cities. They consider it neither frivolous or weak or wasteful to devote one evening to this recreation. We have the same chance at this game in the country that they do. We often hear comparisons drawn between the advantages of city and country life, and while I admit their superiority in many things—in schools, theatres and lectures —I believe we in the country have our compensations, and for certain classes even overbalancing city advantages. I am sure that farmers owning from one to two hundred acres of land, and worth from five to ten thousand dollars, are better situated to enjoy life, and do lead a freer and happier existence; that they have more comfortable homes and grounds, less anxieties, better health and purer and pleasanter natural surroundings than their city brothers.

Amusements for Children.—Our children, however, complain of the lack of amusement on the farm, and they have cause for complaint to a certain extent. When they go to the city they see their friends going to theatres, concerts and lectures, amusements unknown in the country, and they do not offset the advantages country life also has. I think the city boy who spends a week in the country hunting and fishing or loafing, enjoys himself fully as much as the country boy does in the city, but I claim that we might have more enjoyment than we do, and I have suggested whist as one equally practical in either place, and one which in a family of two, three or four children, is excellently adapted to restrain that restlessness which drives so many boys from home.

A Pathetic Sight.—It is at times almost pathetic to see the endeavors farmers make for a little enjoyment. They will all turn out for a circus. My little village usually celebrates the Fourth of July; from miles around farmers and farmers' children come to town and stand around all day in the hot sun, as they think, enjoying themselves. I know plenty of people to whom funerals seem to be about the happiest and almost the only event of their lives. To all these persons, if they have the intellect to comprehend the game, and I believe they have, whist would be a boon and a blessing.

Objections to Cards.—I will close with a word on one point of view on this subject. There are some people who object to games of cards, and while they will allow games of authors, and places, and such, they have a holy horror of cards with spots on them. To these I would quote Charles Wesley. When fault was found with him for setting his hymns to the music of worldly songs, he said he did not propose to let the devil have all the good times. So I would say, whist is a good game—a strong and intellectual, and a beneficial game to know.

Do not give satan the advantage of having the monopoly of such a game. Let him have the games of authors and proverbs, and all such foolish and trifling sports, if you will but reserve this good game for good men. "Bread and the circus," was the old Roman cry. The farmers and farmers' wives have lots of bread. Give us a little more of the circus.

DOES IT PAY TO THINK?

By Hon. W. D. HOARD, Fort Atkinson, Wis.

Fourth Paper.

Whither Are Institutes Leading?—What is this institute business leading to, a game of whist? Well, there is a good deal to be learned in a game of whist. One remark that Mrs. Clark made lets pretty much all of us out. She said that raising large crops did not make a successful farmer; consequently most of us, this year particularly, are very successful farmers.

I am called upon to ask the question, Does it pay to think? The question is answered in the asking to this audience, to-night. If I could reach that great audience in Wisconsin that is not here, never will get here, that don't read, that don't think, and don't study, and even don't play whist, and to whom and for whom the progress of agriculture in Wisconsin has only one hope, and that is a funeral, I might ask this question fairly and squarely; but to this audience, I need not ask it.

Wisconsin to the Front.—Wisconsin to-day is to the front of all the world in this matter of farm education. Does knowledge pay Wisconsin? Has it paid her when we read in Harper's Monthly for April such a magnificent tribute to her practical ability as was written there by Charles Dudley Warner? In my work in Canada and Pennsylvania this winter, I have found myself confronted repeatedly in a way that carried conviction to my heart, that all this work and expense in Wisconsin was paying grandly. I found the agricultural commissioner of the Province of Quebec asking me to sit down with him for half an hour and explain to him the wonderful work that he had heard was being performed in Wisconsin. I found all the intelligence of Canada wide-awake to the work that is being done here; I found Pennsylvania wide-awake; I have found the agricultural journals all interested in this work, anxious to know what Wisconsin is doing. It is a question of applied knowledge.

Does Education Pay?—Now, does this pay? Will it pay in money? Yes, a thousand fold over. I have received this winter over one hundred and fifty letters from gentlemen in the East, all burdened with this refrain:

> "What is the price of land in Wisconsin? We read much about your institute work. We think it must be a grand State to send a boy into, to occupy a farm, where men can amass information like that for the good of the farmer."

To have my State advertised in this way, has paid me a thousand times over, for all the taxes I have paid for the support of the farmers' institutes. Not only does knowledge pay the State of Wisconsin in the way I have indicated, but still more in the practical effect of our institute work on our own people.

A Computation.—Let me give you, for a moment, a computation.

To the very best of my knowledge we planted in Wisconsin last spring, 50,000 acres more fodder corn than we did the year before. What led to that result? The agitation that we had had for two years upon this question in the institutes.

HON. W. D. HOARD.*

What was it worth? Two hundred thousand tons of food added to the supporting power of this State for its live stock, which I suppose is worth at least $1,000,000, and yet there are farmers in this State holding a cent so close to their eyes that they could swear conscientiously there is no moon beyond it. They will say that the little appropriation of $12,000 to carry on this work of enlightenment and stimulus towards the development of the material interests of our State, is being wasted and thrown away.

An ancient writer says: "Every man gives of his own measure."

But, thank God, the farmer element of Wisconsin is not measured by any such small tape line.

Never before in my life have I felt the magnificence of this commonwealth roll in upon me, and the character of it, and the pride of it, as I have in the past three years.

I believe to-day, my friends, that Wisconsin's future is one hundred fold better assured for these influences, than it ever has been before.

Knowledge Pays.—In a Creamery.—I will give an individual illustration as to whether knowledge pays: I visited a creamery a year ago, and asked the proprietor to let me look at his books. I read on those books that farmer A., with thirty cows got $20 apiece from his cows, for the cream for the entire season. It was a poverty stricken result. I read farther that farmer B., with only twenty cows, got $56. for his cream sold to the same creamery. I went over to farmer A. and I said to him:

"Pardon me, sir, but I have been to the creamery and read the result of your summer's work, and I learn that you have got thirty cows and you have only sold $20 worth of cream, and I have come over to look at you. I want to understand the phenomenon," and he says:

"It is none of your blasted business."

I said: "I know it, I am just as well aware of it as though you had made affidavit to the fact, but I want to look at the man; I want to inquire into the philosophy of your being; what manner of man are you?"

---

*Hon. W. D. Hoard was born in Madison County, N. Y., in 1836. Was trained to the business of dairying from childhood to manhood. Emigrated to Wisconsin in 1857. Enlisted in the 4th Vols., May 21, 1861, and remained in the army with the exception of a short interim until July 4th 1865. In 1870, started the Jefferson County Union at Lake Mills, and at once made the paper a strong advocate of the dairy interest. In 1872, while Sergent-at-Arms of the Wisconsin Senate, he issued the call for the formation of the Wisconsin State Dairymen's Association. The association was formed with Mr. Hoard, for its Secretary, which position he held for three years and then resigned. For years the Union carried on a vigorous advocacy of the dairy cause in the West. In 1879 he was elected President of the Northwestern Dairymen's Association, and has been re-elected at every annual meeting since. He is at present also President of the Wisconsin Press Association. In Jan. 1884, he commenced publishing the dairy matter of the Union in a weekly sheet under the name of "Hoard's Dairyman," which has attained a large circulation throughout the dairy districts of the United States. In 1888, he was nominated by the Republicans for Governor of Wisconsin, and was elected by a handsome majority. Mr. Hoard has been connected with the institutes from their first organization.

Well, he and I had a cotillion, so to speak, and I found that that man carried thirty cows for the fun of it, when their keep was costing him $30 per head, and had not intelligence enough on hand in actual brain assets to carry him through the season, and get within $10 of the keep of his cows. I inquired into that man's life and looked at his home. I found that the man never read an agricultural paper, never attended a farmers' institute, and he said:

"You couldn't stuff this darned book larning down me, I am not a book farmer."

Another man, as I said, with twenty cows, was getting $56 per cow. There is the difference. The $56 man was an intelligent, thinking business man.

In the Dairy.—Let me call your attention to another practical exhibition of the fact that knowledge pays. In 1870 commenced the dairy interest of this State, practically, and the agitation of it. Take Jefferson County as an illustration. Jefferson County in 1870 was just emerging from the debauchery of wheat growing, selling out its farms by the bushel. In just ten years from that time, in 1880, under the reviving influences of agitation and better methods in dairying and stock farming, the number of farmers in that county who were depositors in banks above the number in 1870 were as seventy to one. That meant renewed vigor, renewed energy. It meant that they were creditors and not debtors to the banks any longer. The cows of that county are depositing a million dollars a year for their owners, and that has come through agitation, and the growth of knowledge. Certainly it has paid the farmers of Jefferson County to do more and better thinking.

Results in Two Towns.—Now, I will separate the county and give you two towns to show you whether knowledge pays. The town of Koshkonong in 1885 produced 127,000 pounds of butter, for which it received twenty-one and nine-tenths cents per pound. The town of Watertown, only fifteen miles distant from it, produced that year 83,000 pounds of butter, for which they received twelve and nine-tenths cents per pound. Had the farmers of Watertown enriched their thought and their judgment by studying upon this question to the extent that the farmers of Koshkonong did, they would have sold their butter for the same price and would have realized $7,520 more than they got, or $3.71 for every man, woman, and child in the town, and yet they never had spent $50 on their dairy eduction. Not a man in that town, my friends, but who would have been willing to have jumped over a fence backwards to have saved paying his taxes, and yet they lost on that one item alone nearly double their entire tax for that year.

We Must be up and Doing.—Does knowledge pay? Now, these are financial considerations, and I beg you to consider them. We must be up and doing; we must not let the head rest and the hands wear out; we must make more money. The cost of our civilization enraps us like a garment; we cannot live like we did thirty years ago. The boy is calling for more privileges to-day, and the girl too. Education is of a larger character; we are living larger lives; we must do something for our own improvement on all questions. Agriculture to-day means brains and thought. To-day on every side the successful farmer must use the best thought and judgment. It is the intelligent men who are succeeding. In the face of this fact, patent to every one, shall we ask if knowledge pays?

SHEEP AND SWINE SESSION—MARCH 30.

SHEEP HUSBANDRY.

By **H. J. WILKINSON**, Walworth County, Wis.

First Paper.

SUPT MORRISON in the Chair:

A Rough Road to Travel.—The road traveled by the flock-master the last four years has been a rough one, and has shaken about all the sentiment out of the business. In Wisconsin, as sometime in the history of every industry, has come a time when the business, with the most of us, is weighed in the balance for the money there is in it.

Few farmers can long pursue any particular line of farming, simply because of a preferance for it. Money must be had to pay the inevitable taxes, and other expenses, and if one line of farming will not supply it, and cannot be made to do it, another must be adopted.

The flock-masters of this State, and the whole country, are deeply interested in the question, as to how their flocks can be managed to make them yield a profit that will compare favorably with the profits obtained from other branches of farming. And the time allowed me may not be wholly mispent if employed in looking over the ground, to discover such reasons as may exist for believing that the sheep and wool industry is to grow in importance as the wants of the people enlarge, and yet to have its due share of prosperity. Something also, of the present tendencies in the business it may be interesting to note. Is sheep husbandry likely to assume larger proportions, as our wants increase, with increase of population, or is it likely to decline? That it has declined in the last four years, it would be foolish to deny; but that the causes for such decline have been strictly peculiar to this one industry, or of permanent character, or entirely and wholly different from some of the causes similarly affecting other industries from time to time, are, at least open questions.

Demand for Wool.—We have now a population of nearly 60,000,000 people. To meet the demand for wool, for all purposes of manufacture, we need not far from 3000,000,000 pounds, or about 5 pounds per capita each year, according to late and undoubtedly reliable estimates. From the best information attainable, the clip of 1888 will not supply much more than one-half this amount. The deficiency in the amount of home grown will represent a cash value of from sixty to seventy-five millions of dollars, which sum, with late tendencies, would soon be increased to one hundred millions.

Clothing Wool.—The National Association of Wool Manufacturers, a very intelligent body of men comprising a large part of the leading wool manufacturers at the East, are on record repeatedly, as saying that the great bulk of the clothing wool grown in this country is the best for the purposes for which it is used, anywhere produced, and cannot be duplicated from any part of the world. That they use other wool, is not denied; that they mix an inferior article with the more valuable home grown, is admitted. But the fact remains, that 150,000,000 pounds of wool of raw material are now wanted to supply our own home demand for manufactures of wool. We have soil and climate adapted to supplying it, and of a superior quality. Is the amount of money it represents, a sum growing larger year by year, to slip through our fingers without a big effort to retain it?

Competition Fierce.—Competition, the world over, in all the channels of trade and commerce, is continually growing more fierce. The Danes have captured our foreign butter market, and our whilom export of 100,000,000 pounds annually has dwindled to the merest pittance. Our foreign cheese market has gone to our neighbors, the Canadians, and our prospects for recovering our market abroad for either, are far from reassuring. A Danish representative has been in our State this winter, sizing up our dairy interest, and measuring its probable increase and the amount of intelligence put into the business, that they may be forwarned.

Continental Europe, including. even little Denmark, excludes American pork from its markets on the most frivolous pretexts. Are we to lose our foreign market for these things, and others, of which we have an ever growing surplus, and at the same time buy of others a product of vast importance to us, that we can raise a better quality of at home than they can send us? Such a course would be very poor economy, to say the least.

I believe still, that wool-growing is to have a prosperous future in this country. I base my belief on the absolute needs of our people, the better quality of the material produced at home to meet these wants, and economical considerations of national importance.

Methods of Production. — Some changes in methods of production are demanded, and will undoubtedly take place —such changes as will look to diminishing the cost of producing wool, by improved methods of breeding and feeding, and the production of mutton therewith. Something has been done in this direction already. The flock-master to-day who shears an eight pound average from his flock—and a good many are doing it —at thirty cents per pound, gets as much and even more, for his aggregate product, than formerly when selling a six pound average at three shillings per pound; and at that figure, we were all very well satisfied, and would have kept on in the business. That the production of wool, as a first consideration, though not here advocated, may, by attention to the details of breeding, feeding and handling, be cheapened to quite a per cent. below former cost of production is a thing hardly to be doubted.

Flock-masters Discouraged.—For four years flock-masters have been discouraged, and have failed to summon to their aid investigation and experiment. I do not think I underestimate the difficulties in the way of profitable wool growing. A new departure is inevitable, unless we are ready to ignominiously surrender. We are about in the same fix as the old German farmer, of whom the story is told, that he left his own cattle on the shortest kind of rations of dry fodder, to look over a neighbor's cattle, luxuriating in plenty, on the contents of a silo. After regarding them steadily for a while, he was asked if he thought he would build a silo. His sententious but expressive reply was:—"I've got to." We have got to produce wool cheaper.

Characteristics of Breeds Changed.—A hundred years ago, or more, a breed of cattle was established in England, destined to exert a mighty influence upon the stock-growing interests of the whole world. As perfected by the far-seeing breeders of those days, this magnificent breed was equally valuable for yielding milk and butter for the table, and delicious roasts to tickle the palate of the epicure. Years rolled on. They were brought to our own country. Fashion changed the aim of American breeders, and breeding for the show ring and for beef alone changed the characteristics of this noble breed to such an extent that its value to the general farmer (always constituting a large share of the people) has been greatly diminished; and breeders find themselves confronted to-day with the necessity of retracing their steps and entering again from, or recurring to, the former type, if they would maintain the supremacy of their breed.

Our Spanish-Merinoes.—The case with our breeders of Spanish-Merinoes is not entirely parallel, but is in a great degree. The wonderful development of the animal has been just such a one-sided affair. It has looked only to development or improvement of the fleece. Other considerations have been lost sight of. Constitution, size and form have been too much neglected. It would be a curious incident in the history of fine wool production if the present depression in the price of wool resulted in such a change in breeding as would give to the Merinoes greatly enhanced value as a mutton breed. Such a thing is not impossible, hardly improbable. In fact, there are said to be flocks of pure-bred Spanish-Merinoes in Western Pennsylvania and West Virginia averaging much larger sheep than ours, without the excessive folding on the body, and wool of excellent quality, but not so heavy with yolk. They are said to be much sought after to breed up flocks of the ordinary type of Merinoes. Spanish-Merinoes of a not dissimilar type are found in limited number in our own State, and, with their development, a new era in the history of fine wool sheep husbandry, seems entirely within the range of possibilities.

Competition Defied.—With an animal so bred to the requisite standard, or degree of prepotency, the American wool-grower could defy competition, come whence it might. I find in different parts of the State a good many men disposed to stick to their flock of Merinoes. They say they like the business, make a good living at it easily, and will not yet give it up. Others say they will try to change the type of their sheep something in the way I have indicated, or will cross with some of the Downs or long wools, having a belief in their capacity for mature mutton, at least.

For myself, I have little doubt these men will be successful in the end, in their experiment. They all claim, and not without some foundation in truth for their claims, that sheep husbandry, intelligently carried on, and all things considered, compares favorably with other branches of farming. But it necessitates the abandoment of the small pony-built carcass excessively folded, and a fleece of dense, but short and greasy wool. It precludes the idea of breeding exclusively a class of sheep that will make a record like the following, taken from the statistics of the

State sheep shearing, held at Whitewater in April, 1881:

Fleece	*Weight of Carcass.*	*Per cent of Wool to Carcass.*
No. 1—12 lbs. 4 oz.	44¼ lbs.	1 to 3 3-5 lbs.
No. 2—10lbs. 11⅛ oz.	41⅜ lbs.	1 to 3 8-10 lbs.
No. 3—14lbs. 15 oz.	56¾ lbs.	1 to 3 ¾ lbs.

Form and Vigor Diminished.—Is it to be wondered at that persistent effort, to develop a tendency in breeding to produce only a heavy fleece, should have impoverished form, and diminished vigor of offspring? Can anyone give good and substantial reasons, why the ideal Spanish-Merino should not be at least 50 per cent. heavier than now seen; and though shorn of its excessive folds and yolk, still retain, its characteristics of fleece which now make it so valuable in manufactures? May not even an increase of product in wool on a scoured basis, be reasonably looked for with increase in weight of carcass? A solution of these questions may be looked for in the near future, if not from choice, most assuredly from necessity.

Demand for Mutton.—It is undeniable that the increased interest in sheep husbandry, at this time, is due to a demand for mutton, unparalleled in some lines in the history of the country, so far as I know. Not only is mature mutton bringing a high price, but lambs are wanted at prices decidedly remunerative to the grower. A city daily of this week says: "Lambs weighing from 18 to 25 lbs., are quotable from $2.50 to $4.00, and even higher if they could be had—mutton, scarce and firm at from 7 to 8 cents."

There is no good reason why the production of palatable mutton as an important part of our farm industry, should not be quite generally adopted. Neither Australia, South America, nor our Southwestern ranches, with their present systems of sheep farming, can be depended upon to produce mutton of the best quality. Their flocks are too large and too much subjected to the vicissitudes of climactic conditions; with us, it is conceded that a pound of mutton can be made cheaper than a pound of beef, with the farther advantage of the wool.

Downs and Long Wools.—There are scattered about the State a number of breeders of Downs and long wools who are having a genuine boom in their business. I am more than glad of their good fortune. It has been some time coming, but the indications are, that the mutton breeds are to have a much larger share of attention in the future. There is room for all, and all are needed and have their excellent qualities. A general public demand for good mutton once established is not likely to soon subside.

The pure bred animals of these breeds are now too valuable, and too much sought after for breeding purposes, to be as yet available in directly increasing the supply of mutton; so that the demand for it must be met of necessity in great measure from good cross-bred flocks.

Does Sheep Farming Pay?—It will not do to say that sheep farming does not pay; for not a few instances might be given, and probably some will be to-day, of large profits to different individuals engaged in it.

Don't Abandon Sheep Raising.—I have endeavored in these disconnected remarks to lead you, and through you, the men engaged in the various lines of sheep farming in our State, into rather a new channel of thought, to a more comprehensive view of the business; rather than to try to tell what, after all, might not, and probably would not, be new to you. I cannot help feeling a keen interest in the welfare of sheep breeders and wool-growers, and should regard it as a public calamity were they obliged to farther abandon their business. I do not hesitate to go on record as saying, to those who have farms adapted to the business, and who like it, and have the experience quite likely to accompany such conditions, don't abandon the business, expecting to easily find a more remunerative one, or one that always returns larger profits; and in closing let me say this: Don't fail to put into the business all the intelligence and skill, in feeding breeding and handling, the times demand, and without which you cannot reasonably expect to succeed.

EXPERIENCE IN SHEEP-RAISING.

By W. L. AMES, Dane County, Wis.

Second Paper.

Early Ancestry.—For twenty years past, I have had liberal opportunities for observation in the sheep line, and memory quite vividly accompanies me considerably farther back; yet not sufficiently far to recall any feature of the transaction whereby, for and in consideration of the sum of six dollars, my worthy ancestor became the possessor of four superlatively native ewes, averaging a fleece of less than two pounds, and with a weight of carcass correspondingly heavy. Such was the original and pioneer ancestry on the mother side of not only our present average yearly flock of 500 sheep, but of many hundreds disposed of on a mutton market.

Suggestions to Sheep-Breeders.—For several years past it has been my pleasure to be a sharer in not only the gains, but the losses connected with the handling and rearing of sheep. We lay no claims to fancy breeding, but breed and handle only our own product, and that only as any practical farmer may whose taste lies in that direction, who can appreciate their advantages in connection with good farming, and lastly, who can forego the pleasures of spending his time lounging on dry goods boxes and counters, and loafing on the streets of the nearest village, when he should be at home attending to his animals, which, in return for favors rendered him, are also dependent on him for a certain amount of care and attention —and generally to just about that extent that he cares for and attends to them, will they prove remunerative to him. Let him, who cannot this much deny himself, leave sheep husbandry to some one else.

Objects and Gains.—Our mode of management has been so odd in comparison with that of the majority of farmers, in so persistently and continuously clinging to sheep as a factor in our farming, that we may almost be considered eccentrics in that line, and these questions may very naturally arise: What have been your objects, and what your gains?

In answer to the first, I would say that we desired to improve on what was at our hand, and that there was room for improvement on such a quartette of sheep as I have described, none can dispute. We also, at an early day, observed an economic relation existing between shepherding and grain raising.

Second, as to our gains, I consider that we have built up, out of this meager percentage on the one side, and improved males on the other, a flock of sheep worthy of fair consideration, and at the same time, have built up, out of sadly impoverished lands, a farm of nearly 400 acres, whose fertility and producing qualities, to-day, I believe, are second to not many, in this the hub county of Wisconsin.

Size, Wool and Numbers.—Our experience in breeding has thus far been entirely in the direction of fine wool sheep, and with three objects kept persistently in view, namely, size, wool and numbers.

As to size: From the diminutive maternal ancestry before mentioned, coupled with improved males, breeding only from mature animals, and by careful and considerate general management, we have secured a size in fine wool sheep that is most gratifying to us, and quite a source of comment from observers.

For several years past, our yearly mutton flock has numbered about 120, averaging at time of sale from 110 to 118 pounds. Of the three sires of our last three crops of lambs, we sold two not long since, one weighing 175, and the other 195 pounds, retaining for farther use the third, which weighs nearly 200 pounds.

In the wool line, the ideal toward which we earnestly labor is a long, fine, wooly wool, and a bulky, fleecy fleece, instead of a soggy lump, at the same time as weighty a fleece as possible without detriment to the above mentioned important properties. Of the three above mentioned sires, at our last shearing, two sheared 23 pounds each, and one 24. Our entire flock of about 400, averaged 9 pounds. The heaviest, though by no means the best fleece that we ever produced and sheared, weighed 29½ pounds.

As to numbers: We desire to carry as many sheep as will properly utilize such a proportion of the farm for pasture during the pasturing season that they may make the rounds of the farm ordinarily about once in five years. And farther, as one of our prime objects in continuance in sheep husbandry is for their renovating properties on exhausted lands, numbers with us have been an important consideration, and as no other breeds will compare with the fine wools for keeping in large flocks, that has been one of our reasons for so persistently clinging to that type of sheep.

How to Secure a Good Clip.—To produce and secure a clip of wool in good condition, requires much and untiring care. To prevent the accumulation of foreign substances in wool, certain requirements are almost absolute. Never feed under the grain measure or the fork; place the feed and then let the sheep to it. Never give them access to hay or straw stacks. Secure to them a dry place to lie so that the under parts of the sheep shall shear as freely as the sides. Avoid exposure to bleaching storms as much as possible when the wool is nearly grown, and to have a fibre of uniform strength requires uniformity of care, rations and general conditions.

Then if, for a clip of wool produced under the above mentioned conditions, we could secure a price based upon its real comparative merits with other competitive clips, instead of assigning to it an almost absolute and unconditional value, based upon an imaginary commodity called "washed wool," there would still be some satisfaction in producing a clip of good wool.

Washed and Unwashed Wool.—To illustrate the existing inconsistency, let me narrate a brief experience that has come to us within two years past: Two buyers called, examined our wool, and from their own thorough and personal examination considered it washed wool, although water had not touched it for at least two months previous to shearing, to say nothing about washing. They were unceasing in their compliments to the wool—how clean it was, etc.; but they found it a rather heavier grade than they wanted, and presented arguments to convince me that 8 pounds was heavy for washed wool, an argument that I had no grounds for disputing.

But I pressed them for an offer, which they finally made, 25 cents per pound. Before undeceiving them, I loudly denounced the unjust absolute discrimination between so-called washed and unwashed wool, to every word of which they assented, as did the school board in one of Carleton's poems—"them's my sentiments, too." After disclosing to them the fact that the wool had never been washed, they could give but 17 cts., but were in too great haste to make the next point, to stop to close a bargain.

Economy in Sheep Husbandry.—Our experience indicates to us that there is an economy in sheep husbandry worthy of careful consideration. There is still a class of farmers among us who make no pretentions to raising and selling anything from their farms except grain. And what is the tendency of such farms. So evident that a blind man can preceive it. Some such have already run their course and portions, at least, been abandoned. In contemplating, I am almost led to explain: Oh, destructive man, review some of thy works, and blush!

I believe I have not misrepresented, for we have had to do with at least two parcels of above described lands, portions of each of which had been abandoned to weeds, and although naturally of the best of soils, had become so attenuated in grain raising that they had *all but failed* to bring forth. We bought, seeded, and devoted to sheep pasturage for five years, and behold a magical change! At that time a portion was hesitatingly disturbed and cropped, and produced most bountifully, although it was the first of the last two dry seasons. What did our sheep do for us in all this? Well, we bought cheap lands, but through the agency of our sheep, we harvested from those lands each year a bountiful crop of mutton and wool, without teams, plows and harrows to cultivate, or expensive binders to harvest, returned almost element for element to the soil again, and in the meantime almost doubled the value of the land. Not a bad account for the sheep column.

Adaptation to the Business.—It is frequently remarked to us: "You seem to be more than ordinarily adapted to keeping sheep." Not so. While to any man who says within himself, "somehow, I don't like sheep," I would say leave the handling of them to someone else then, yet there are many farms near us at the present time, on which sheep would pay better than they will on ours. The more impoverished the land, the more evident their renovating properties. Of late, our sheep remain out continuously during the grass season without disturbance from dogs or wolves. For relief from the latter try "scare crows."

Sheep and Weeds.—Nothing has as yet equalled sheep in clearing land of foul plants, such as burdocks, pitch fork, etc. We were once the happy possessors of a patch of Canada thistles which defied all efforts at extermination until we were able to bring our sheep to bear on them, when, with a mixture of sheep and salt, they yielded at once.

Value of Sheep to Land.—A neighbor not long since proposed to us to rent some land that he was interested in, and put our sheep on it. During the conversation mention was made of renumeration at the rate of 3 dollars per acre. I did not question him closely, but suppose he meant to pay us that amount for the use of our sheep on each acre occupied. But we were loth to let them go at that price as we have some use for them yet ourselves.

Ticks and Contagious Diseases.—To ticks we are strangers, not one having appeared on our flock for many years. Fair keeping, handling only our own product, and one dose of tobacco juice administered fully 20 years ago, have been our only actions against them. Neither have we any experience whatever with contagious diseases among sheep. Among our sheep to-day is not one poor in flesh nor one from whose pelt the wool has started.

Element of Success.—One of the principal elements of success in any line is patient continuance. He that continually jumps from one line of business or breeding to another, endeavoring to follow all the freaks and turns of trade, will not infrequen'ly find himself left when he arrives at the coveted point, and the will-o-the-wisp beacon will again appear in another direction.

Thus far I consider that we have followed sheep husbandry with certain purposes in view, and while success has attended our efforts to an extent fairly gratifying to ourselves, yet not sufficient to warrant us in folding our arms at this point and exclaiming, good enough! But rather, that experience, which has become ours only by years of labor and close observation, only armors us for renewed efforts in a line in which, in connection with clovering, lie resurrecting properties to many an exhausted acre.

THE HANDLING OF SHEEP.

By C. A. HATCH, Richland County, Wis.

Third Paper,

General Management.—Successful sheep farming depends on the close and careful attention to three essential points, viz: Breeding, feeding and the handling, or general management of the flock, aside either from breeding or feeding. A farmer may be a good breeder, and also a good feeder, and yet come short of success for want of good management. By management, I mean the selection of the flock to start with, the culling out of inferior and unprofitable individuals, which is so essential to permanent success, dividing for wintering, marketing wool and mutton, etc. Then let us first consider

The Selection of Breed. — Nearness to market, number to be kept in one flock, kind of buildings to be used as winter quarters, and skill of the shepherd, must be taken into account in determining which of the breeds will be kept. There are three lines of sheep farming:

1. Where wool is the main object, and mutton the second consideration.
2. Where mutton is the first consideration, and wool secondary.
3. Where early lambs are the main crop, and wool and the mature mutton sheep second.

The wool production can be carried on with the least expense for buildings and attendance, and the product being of easy transportation, can be run with profit farther from a central market; larger flocks of this type of sheep can be kept in one flock, and they will thrive on poorer pasture. The farmer can select no breed that excels the American Merino for this purpose. They are hardy, long-lived, and no breed has ever equalled them in per cent. of wool to carcass. For the

Mutton Production,—Nearness to railroad transportation is essential, for a fat sheep is a poor traveller, and were they to be driven far, the loss in flesh and exhaustion of individuals might consume all profit. There are two classes of sheep adapted to this line of sheep husbandry, viz: The long wools (Cotswolds and Leicestershires), and the short wools, or Downs breeds. The long wools attain the larger weights, perhaps, but require abundant pasture, and small flocks. The Downs breeds, while not usually attaining to as great weights, mature younger, and will stand crowding better. If mutton in the shape of lambs is to be sold, early maturity is one grand consideration, and perhaps for this line alone, no breed excels the Southdowns; others may be equally good, but think none are better.

Stabling.—Good warm stables for winter are essental for lamb raising, which adds to the expense, and an experienced shepherd alone can hope to succeed in this line, for the lambs must be dropped in the middle of winter, when all the elements are against them, and careful, skilful management alone can hope for success.

Slowness of Maturing.—In a wool breed slowness of maturing (which always goes with long life) is desirable, so that one and the same animal may furnish a large number of shearings, while on the other hand early maturity and short life of necessity are to be sought for in a mutton sheep, so that the flock may be quickly changed and sold to be replaced with other and immature stock, for here the profit is made on the growth of the animal itself. In the first case the profit comes from the mature animal. There is really no war of the breeds, for each has it merits and demerits, and adaptability to especial purposes, and if we are wise we will select that breed which is adapted to our particular needs, and not attempt to combine all the good points in one animal. Life is too short, and the chance of success too uncertain. Neither can it be made profitable to be continually changing breeds. Choose your breed adapted by nature and breeding to your purpose, and then stick to it. In order to understand the position of each breed, let us make out a sort of debit and credit account as it were, of their merits and demerits.

The Mutton Breeds.—1. They are more prolific, twin lambs being the rule rather than the exception.

2. Early maturity, which gives opportunity of making the greatest possible growth of carcass, in the least possible time.

3. Good milkers, and attentive mothers which give the lambs the best possible chance.

4. Their size gives them advantage

over the smaller breeds, as the loss in waste between the live animal and dressed meat is smaller comparatively.

5. The quality of the mutton is the best.

Against these advantages, we have the disadvantage of thin fleeces, making them poor shearers, and not giving them the same natural advantages to resist cold, that the thick close wool of the Merino does. They also require better pasture, and more feed per given number, from the very fact of their early maturing qualities, as nature in all her prodigality ever refuses to make something out of nothing, and good fast growth of necessity means good feed, and plenty of it.

The Wool Breeds.—1. Hardy, can stand storms better on account of the fleece being close and compact, which fact also makes them heavy shearers, as compared with their live weight.

2. They can be kept in large flocks with little or no inconvenience.

3. Can live and thrive on poorer pastures, being more inclined to travel over a wide range than the larger breeds.

4. They are long lived, making their life of usefulness frequently extend over a period of eight or nine years.

On the other side, or debit column, we have lack of size, unprolificness, and slowness of growth, and the ewes as a rule are not as good milkers as any of the mutton breeds. After having settled which line of sheep farming you will adopt, and having selected the breed suited to that especial purpose the next consideration is the sheep as an individual, that is

Selection of the Flock.—There are certain characteristics and peculiarities which belong to each kind of sheep, and which will be well to bear in mind, as for instance the mutton breeds require that the hams should be large and heavy, and the general shape of the body be blocky and square built, with a clean neck and jaw, i e., free from any looseness of skin or dew-lap. On the other hand a Merino must have a certain looseness of skin (not necessarily wrinkles) and a dew-lap that extends almost to the point of the chin. While a broad ham and low flank is desirable, with them a thick ham is not really so.

Vigor and strength of vitality are of prime importance in any breed; they give power to transmit qualities to offspring, overcome disease, exposure, and the many hardships which all flocks are more or less exposed to.

This is indicated by strong deep shoulders, short thick neck, and a general roundness of the whole body. The neck of the ram should be straight from head to point of shoulder, or slightly arched; the ewe should have a straight or a slight downward curve. Back should be straight, neither arched nor sagged, tail high set, ham straight or rounded, and broad with low flank. Underline of body straight or slightly curved downward, but never a pinched or grey-hound look; legs short, broad and large jointed.

The Fleece—Should be as uniform as possible, free from coarse hairs on flank and neck, and covering the body well, especially on the belly; no short stiff hairs, and as free from yolk or gum as is consistent with elasticity, strength and luster.

The Merino should have wool nearly covering the face, and the legs entirely, while the mutton breeds should have a clean jaw and clean legs from the knee down.

Uniformity of flock is desirable, so as to get a uniform product, either of wool or mutton, for a great range of quality will not command the highest price in market.

The length of the wool should be

looked to, other things being equal. Length gives value, but always remember thickness gives weight, rather than length of staple.

Culling—Should go on constantly if you would get and keep a fine flock, and the finer the qualities of the flock, and the better the care, the larger the net profit. If a flock be ever so carefully bred and managed, there will always be inferior animals which can be kept only at a loss, and it is the shepherd's place to always have an attentive eye to these points, and turn any inferior or unprofitable animal off as soon as possible, rather than to keep it as a breeder to transmit its poor qualities to the flock through its offspring.

No sheep should be kept after age has begun to thin the fleece, unless for some xtra good breeding qualities, and even then it may be of questionable profit, for may we not thus lower the general thrift and vitality.

Poor Feeding Qualities,—And unthriftiness should send an animal to the butcher, no matter what the pedigree. All animals deficient in size or form should share the same fate, keeping only the best specimens, for with such only can you hope to perpetuate the good qualities, and get the greatest profit. The best one time to cull is at shearing-time; then deficiency of carcass, form and fleece are most apparent and all individuals deficient in any point should be marked and sent to the butcher as soon as the condition of the flock and state of the market will warrant.

As a rule wethers can not be kept with profit after having attained their full growth, for their place can be supplied by breeding ewes, which give, in addition to the fleece, a profit in the lamb, or lambs.

Marketing.—As a rule the best time to sell wool is as soon as it is ready for market; then the buyers are expecting it; competition is sharper and we stand a better chance than to sell out of season, when perhaps buyers are fewer, competition less, and those in the market not over-anxious to take a small lot after having shipped the season's purchase, and the farmer who holds his clip for a rise, stands about an even chance of getting a fall, while those who sell as soon as it is ready, in a course of ten years, will strike the high market as often as the low.

Be sure the fleeces are put up in good marketable shape, nicely tied with not too much twine, and showing only the bright side, that came off next the sheep; reject all tags, dirt, or anything that tends to "load" the fleece, and in the long run you will be the winner, besides having a clear conscience in the meantime.

Washed fleeces have gone out of date in most wool-growing districts, on account of the tendency of the practice to foster fraud, many of the clips being washed only in name, which is a great injustice to the one who tries to do honest work.

One of the strongest points of competition which foreign wool has over home grown, is in this matter of care in tieing and sorting the wool, the foreign article suffering a loss of only from 20 to 30 per cent., while American grown goes from 35 to 75 per cent., the average being for fine about 50 per cent. Can the manufacturer be blamed for wanting a good straight article?

And where does the blame belong, on the farmer who ties the fleece full of rottenness and filth, or on the buyer who accepts such a "whitened sepulcher?"

The latter buys with the expectancy that he will be subjected to a heavy discount, and bases his prices accordingly, while the former who sells his tags at the price of good wool is not only cheating himself in the long run, but makes a reputation in no small degree for his more honest neighbor, the poor article lowering the price of all coming from a given locality.

Selling Mutton.—Mutton, the other salable product of every sheep farm, should be sold at the time when it brings the highest price, provided there is no extra cost of production to offset this extra price. Winter or spring mutton costs more than fall or summer mutton, but in the spring we have the fleece to offset this and in summer the cheapness of feed, and favorable weather for growth. As a rule, no sheep that have not been grain fed should be sold, whatever the time of year, for no matter how round and plump they may look, a small ration of grain will add much to the weight and quality even on full grass feed.

Time to Sell.—The poorest time to sell is in the fall, when every shiftless farmer is thinning out his flock to make amends for a poor hay and grain crop. Better hold and feed well for a month or two later, get some good manure, fatter sheep, and better prices. Of course winter lambs must be sold in the spring, usually about June 1st., and in my opinion their mother should soon follow, for the high feed which is necessary to get the best results in lambs, has a bad effect on the ewes if allowed to run down again, many of them refusing to raise lambs the next year, and others being so spoiled by their high living that they are like the pampered and high fed belles of the city, worthless for vitality or mother functions.

The shepherd who understands his business, will as a rule make the wool and lambs pay, or more than pay, all expenses and have the mutton sold as clear profit.

Conclusion.—In conclusion I will say, let the farmer breed intelligently, feed intelligently, and handle his flock intelligently, and he is sure of good pay, quick returns, increased fertility of his acres and an ample inheritance for his children.

SHEEP IN WISCONSIN AGRICULTURE.

By GEO. McKERROW, Waukesha County, Wis.

Fourth Paper.

An Age of Progress.—Agriculture is acknowledged by all civilized nations to be their life current. Impoverish this life blood and you impoverish the nation; enrich the current and you enrich the masses. Therefore, we are met here to discuss the different elements of Wisconsin agriculture, and how to improve upon prevailing methods and customs. This is an age of progress, and the farmer, who is the corner stone, the foundation rock, of our country's progress, is fast learning that unless he bestirs himself in his line, he will soon be pushed to the wall by the strong competition of the times.

Have a Specialty.—Diversified farming is a necessity, yet every farmer should have his specialty. Let the man who likes dairying best adopt that. The lover of horseflesh will succeed as a horse-breeder; the man who admires the hog, and thinks him the cleanest of the domestic animals, will succeed in swine-breeding; But of our live stock, none is a more important factor in a complete and successful system of farming than the sheep.

Sheep on High-Priced Land.—We often hear the remark that our lands of Southern and Central Wisconsin are too valuable for wool production. This may be true if you confine sheep-husbandry to wool-production alone. You might as well raise wheat for the straw as to raise sheep for their wool alone on our high-priced lands, with the wool markets of the world in their present condition. The English farmers, who lead the world as successful agriculturists, raise sheep profitably on lands worth from $300 to $500 per acre. You may ask: Why do they do this, and how do they do it? In answer to the first question, I will say that they have found the sheep to be the best of fertilizing agents, a manufacturer that they can not dispense with. He returns 95 per cent. of the fertilizing matter of all the foods that he consumes to the soil. Prof. Stewart, in his "Feeding Animals," tells us that wheat bran is worth $18 per ton as a fertilizer, oil meal $30.48, and clover hay $11.45 per ton. Most of our other fodders are worth as much for fertilizers as it costs to produce them. So you can easily see that the English farmer needs the sheep to assist him in keeping up the value of his high-priced land, and, my friend, we need him. John Johnston, of Geneva, N. Y., changed a poor worn-out farm to one of the best in the country by a system of underdraining and sheep-feeding. Many of us know of worn-out grain farms that have been brought back to a high state of fertility by grass and sheep.

Economical Meat.—Another reason why the English farmer holds to the sheep is because he has found him to be the most economical producer of the best of meat. The eminent experimenter, Sir. J. B. Lawes, tells us that the sheep stores up 12 per cent. of the dry food consumed, while cattle store up 8 per cent., or 8½ lbs. of dry food increases the live weight of the sheep as much as 12½ lbs. of the same food will increase the weight of the bullock. Adding to this the fact that good lamb and mutton are on the average as high or higher in price than veal and beef, and are classed as high in nutritive value as a food, gives us a good reason why John Bull holds to his mutton chop and why the Yankee should reach out for *his* share.

Breeding and Feeding for Profit.—How do they make sheep husbandry profitable on their high-priced lands? They do it by adopting a means to an end. They *breed* for it and they *feed* for it. As civilized nations have advanced in the processes of agriculture, mutton has become the primary consideration of this business and wool only secondary. France improved the mutton qualities of the Merino, and our Merino breeders are now agitating in the same direction. Germany for years has been calling on Englrnd for mutton rams to cross on her Merino flocks, and they tell us that the Down Merino cross is a success.

England, the acknowledged leader in the line of mutton sheep, first improved her Leicesters, Cotswold and Southdowns, but more recently her breeders have developed and brought to the front the Lincoln, Romney Marsh, Dorset

Shropshire, Hampshire and Oxfordshire Downs.

The Leading Mutton Sheep.—Judging from prizes won at fairs and fat stock shows, prices made at sales and lettings, and prices brought in the mutton markets, in connection with statements from agricultural journals, we believe that we are justified in stating that the Downs are the leading mutton sheep of the world to-day. We have tried several of these English breeds and their grades, both as breeders and feeders, and have found the Downs in general to be good prolific breeders of strong, healthy, fast growing lambs, and very quick feeders and, above all, the best of sellers. For these reasons, we advocate as a general-purpose sheep the Downs breed in general and the Oxford-downs in particular. The condition under which the Oxfords were developed, and the purposes for which they were specially bred, fit them to take a very important place in our advancing system of sheep husbandry.

Origin of the Oxford-downs.—In a low, moist, and rich district at the foot of the Cotswold hills the older breeds, such as the Cotswold and Southdown, had been used, but they apparently did not have the constitutional vigor necessary to thrive continuously on the rank, rich herbage of this district. In 1828 a Mr. Hitchman made a cross between the Hampshires and Cotswolds, and in 1833 the Messrs. Druce, father and son, made a Southdown and Cotswold cross. Many others followed suit, and in a few years these cross-bred sheep almost drove the older breeds from this district. By careful selection and breeding, they were soon brought to public notice as a valuable accession to the improved breeds, and possessing a vigorous constitution, prolific tendencies, quick growth, valuable fleeces, and large choice mutton forms, their friends and breeders in 1857 adopted the name, Oxford-down, and soon after they were admitted to the English show rings as a distinct breed. From these rings they annually go loaded with honors.

What Breeders Think of Them.—Richard S. Fay, of Lynn, Mass., and Wm. C. Rives, of Virginia, were the first of our countrymen to introduce these sheep to our shores, bringing over the first lot about 1860. Mr. Fay says of them in 1863:

"I have had no trouble in raising all their lambs, 160 per cent. in 1862 and 175 per cent. in 1863. They thrive well on my rocky pastures, yielding 8 and 8½ pounds of wool per head on the average, in 1862-3 the shorn ewes averaging 135 pounds, and the rams 220 pounds."

T. S. Cooper says of these sheep: "After trying other Downs, I have chosen the Oxford as the best."

Prof. Brown, of the Ontario Agricultural College, who is experimenting with all breeds, says: "The Oxford has unquestionably stood the over all comparison the best."

Geo. W. Franklin, an Iowa sheep breeder and feeder, in an article in a late issue of the Breeder's Gazette: "Though a breeder of Cotswolds, I admit the black-faced muttons bring the best prices, and I think the Oxford-down the best of these dark-faced breeds."

Mr. Hill, of Sheboygan County, in this State writes me that the Oxfords have given him very good satisfaction. His flock has averaged over 12 pounds of wool per head for the past two seasons, and in 1887 his twenty ewes raised him thirty-one lambs, or 155 per cent.

Our experience with the Oxford and its grades for the past nine years has been very satisfactory. They have flocked well; in a lot ranging from 125 to 200 head, have produced from 110 to 135 per cent. of lambs. We have shown them at leading Wisconsin fairs, and have won a large share of prizes, often coming in competition with other breeds. Our grade Oxfords have never been beaten where shown and coming in competition with grades of all kinds. This is pretty good proof that they are a valuable breed to grade up the common sheep of the country.

John Rutherford, of Canada, the largest exhibitor and prize winner of sheep at the last fat stock show held in Chicago, said to me on November 19:

"I know but little of these Oxfords, but the finest lot of mutton lambs I know of in Canada this season are a lot sired by an Oxford ram from Leicester dams. They were April lambs, and I offered $5 per head for the lot in August but could not get them. I bought one for a show lamb that weighs 154 pounds and never had grain or extra feed until I bought him."

Matthew Howitt, of Muckwonago, raised a lot of grade Oxford lambs last season which were dropped in April and sold the 8th of November at $4.51 per head. They were raised on very short pasture without grain. The dams of these lambs sold at auction, March 20, at $8 per head. I could give many more instances of the value of the improved mutton breeds, both in their purity and as factors in grading up common stock.

Heavy Weights.—The English have not only bred well but they have fed well, producing Lincolns and Oxfords that have weighed over 400 pounds at maturity. The younger Druce says our Oxfords weigh, on an average, 140 pounds at 12 to 14 months of age

A pen of Oxfords weighed, at the Smithfield show in 1873, an average of 298 pounds at 22 months old.

Hampshire-down lambs at a year old with fair feed are said to weigh 130 to 140 pounds.

Lincolns under good feeding will dress, at two years old, 120 to 160 pounds, and exceptional ones have dressed as high as 360 pounds.

Early Maturity. — Cotswolds and Leicesters have also been fed up to weights nearly as good at the same ages, showing us plainly that the English do not depend on a straw pile to dedevelop their muttons as too many of us do. They have learned that the great secret of success is early maturity; that if a ewe is poorly fed so that her lamb will only gain 1½ to 2 pounds per week, while another is well fed and her lamb gains 2½ to 3 pounds per week, the lamb of the latter is double the weight of the former at the end of three or four months. It is not only worth twice as much on account of its weight, but its quality makes it three or four times as valuable.

We all know that the yearling that weighs 120 to 130 pounds is worth double the one that weighs only 80 or 90 pounds. We are told by all experimenters that meat can be grown on young animals at ¼ to ⅔ the cost that it can be produced on older ones, and in the case of the sheep it sells on the lamb for from 50 to 200 per cent. more than on the old sheep, a 60 pound lamb often selling for $5, while a 60 pound sheep in the same market will only bring $2.

Lessons.—These facts should teach us a few lessons:

1. That our lands are neither too good in quality nor too high in price to admit of successful sheep husbandry.

2. That we must protect this industry by good breeding and feeding, which will produce gilt edged lambs and muttons and choice fleeces of good wool.

3. That we must choose sheep of good vigorous constitutions, able to stand high feed and our extremes of a Wisconsin climate.

With these lessons well learned, and our flocks culled of the trash found in many of them, the dawn of a new era in Wisconsin sheep-breeding and wool-growing is at hand—yes, it is actually here. I have met numbers of sheep-breeders during the past season who say their flocks are paying them as well as any stock they handle, with less capital and labor invested. But I find from their conversation that they are all men who appreciate the fact that something of value can not be produced from *nothing*. They are all working for a purpose; therefore their success.

STATUS OF SHEEP-RAISING TO-DAY.

By A. H. CRAIG, Waukesha County, Wis.

Fifth Paper.

Depression of the Industry.—At the present time great interest is felt for the prosperity of the American sheep. It is not the interest which would boom to an excitement, but rather an anxiety, a brooding fear, an anticipated calamity. Nowhere in this broad land of ours do we find one encouraging voice to proclaim cheerfulness and enthusiasm. It seems as though there had been a concerted movement for all to unite and crush out the life and energy which has heretofore been invested in this great enterprise of our people. Not only do we, who breed the American Merino, shake our heads in a pathetic, solemn manner, but we openly discuss the question of a failure, thereby placing a barrier against any possible extension of this business. That man is considered a fool, who will engage in a business where all complain of no profit and no prospect of their being one.

This is the condition of the Merino of to-day. Our farmer boasts that the fine wool sheep, which was his great bank account, has been lost in the darkness which we have been picturing to our imagination. We have forgotten the songs of praise we used to sing when we declared that the sheep never died in debt, that the lamb, the wool, the pelt, always stood as an offering of a well spent life. We have forgotten the strong claims we always advanced, that with sheep the soil became more fertile, our crops more profitable and the advancement to a higher state of cultivation. All these things time and again have we declared as a direct result of the husbandry of sheep. If they were true, then why now turn your backs against these creatures, belie their goodness and abuse their race?

Who is to Blame?—Who is to blame for this want of confidence, this lack of enthusiasm? Is it the man who would engage in its occupation? No. It is you who breed the sheep who must bear the burden of your own folly. You are the ones who have cried against it and brought yourselves down to a disregard of your own convictions. Then what can you expect of the sentiments of others? They hear the wailing and gnashing of teeth, and hasten to more congenial subjects. They do not stop to investigate your business, and if they did, you would show the dark side of the picture to them. Now, we have had enough of this drivelling idiocy.

Dissatisfied With Prosperity. — The Merino is in no danger and can never be driven from the shores of America. This country is its natural home, our climate is adapted to its natural existence, and our pasturage the most wholesome on the face of the globe. We may have our seasons of depression, but as sure as day follows night the clouds will lift and we shall smile again. Ah, how true it is that, as a people, we are restless and uneasy in our own occupations. We are not satisfied with our apparent prosperity and desire to succeed faster, to accumulate wealth more rapidly. We see the booming of our neighbor's business, and are not content until we get into the same boat. We sell at a sacrifice and buy at advanced prices, and then grumble at the unequal results of fickle fortune's favors.

Losing Their Grip.— To-day the breeders of Merinoes feel as though they had lost their grip upon their prosperity. They see the thousands of dairy factories springing up in every part of the great Central States of our union. They see the success of this system of co-operation. They listen to the practical teachings of the silo and its economical features in dairying. They are taught to treat the cow like a lady. They are shown the great relations which exist in the material intricacies of her organization, and how to profit by the workings of nature. They are instructed how to feed, to water, to milk, to handle. In fact, every particular which leads to the utilizing of nature's forces, and its adaptation to that secret of all success—the economy of our resources. With these careful considerations, we behold the wonderful success of the earnest and determined dairyman.

How Sheep Are Treated.—But who of you ever thought to treat the sheep like a lady, to warm her water, to build a silo, to develop her maternal organization? These men are almost as scattering as hens' teeth. You select your choicest pastures, your choicest hay, your choicest shelter and barn-room for the others of God's creatures, but the poor sheep that supplies us with warm raiment for our rigid climate must almost shirk for himself. They are turned upon pastures sunburned and barren, without one tree for shelter, and often no water but from the wells of heaven. Not only are they left to scratch for themselves during the six months of summer, but often receive worse treatment in the winter. It is a fact, gentlemen. I have known sheep wintered without one swallow of water, or one mouthful of grain, and then yield a handsome reward for the inhuman and cruel abuse heaped upon them.

Do this with the cow, the horse, or the hog, and you would go to the bottom so quick that you would have no time to swim. But here you fairly curse the only industry that will live and bear its fruit under this barbarous, wicked and unfeeling course of treatment.

Stop Your Grumbling—About a debased industry, and seek to build it up. Encourage others and you will encourage yourself. Remember that there is no animal under the blue canopy of heaven so willing in its natural organization to yield to the will of man. Its constitution is the strongest, the spark of life the most tenacious, and its power to produce profit the most certain. It is never in debt but always figures on the credit side of the ledger. Ah, but I hear a whispered voice say that wool is only twenty-five cents per pound? Do you hear the same voice declaring against butter at a shilling, wheat at sixty cents, and pork at two and a half cents? If wool is low do not jump upon their backs and drive them into the mud. Wait for a reaction, for it will come. Can you point to an industry of importance that has never languished by the wayside? No you cannot, and mark me, friends, do not pin your faith too heavily upon the future successes of the dairy. It is true the cow is a grand animal, a noble animal, an indispensible animal, in our household wants, but who can say that because she is queen to-day that she shall rule to-morrow? Just as sure as there is a cause and effect just so sure will you see a reaction. The wool interest will arouse its own activity, and you who have lost your faith will be too late to feel the enthusiasm which must follow. You will be so deeply confined to other occupations that to come to our side of the house would be worse than swapping horses while crossing a stream.

Sheep vs. Cows.—This to you may be theoretical, but let us for a moment examine the practical side of the twenty-five cent question. Let us assume that your flock of two hundred sheep shears an average of eight pounds per head of good merchantable wool. You receive twenty-five cents per pound. This gives you $200 per head, or $400, all in one lump and capable of accomplishing some object. Your labor has been light, your care not attentive and your independence as perfect as any form of labor can be.

In the place of the 200 sheep you keep fifteen cows, three heifers and five yearlings. This forms the basis of your herd, to match its opposite. Now, remember the average cow of Wisconsin does not yield 150 pounds of butter a year, and that it takes the entire amount of this 150 pounds to pay for her keeping. Again I hear that voice say the yield should be from 200 to 300 pounds, so it should, and follow the teachings of these institutes and you will accomplish it; but show me the man who wins it and I will show you the nine who fall below. Practically speaking the common cow and the common dairy scarcely yield your own labor. In the flock of sheep you have not been sitting on the stool twice a day, 365 times a year. The housewife has not skimmed and washed and churned until her back ached and her limbs grew weak with exertion. You have none of this. You have not been compelled to crawl out of your bed Sunday mornings at five o'clock, because the cows must be milked, nor to hurry home in the evening to sit on the same stool. Suppose your cows have yielded a reward of $25 each, you are still behind the man who kept the sheep.

Possibilities. — Now, gentlemen, I have given you a fair estimate of the two industries, and the Merino sheep still stand at the head; but we will now step to the side of possibilities. We will treat this animal as Mr. Hoard treats his dairy. We will study our own common sense. We will study the requirements of our people and labor in that direction. We will write upon our guide-board, wool, mutton and constitution. The wool for raiment, mutton for food and constitution the foundation of all improvements. The Merino, as I have said before, is capable of any development which we may require of it. There is no reason why this breed should not be a mutton breed as well as that of fine wool. Bear in mind that the present development of the coarse wooled varieties of our sheep is the production of man, not of nature. From their native runs they have been bred up to the present standard of excellency. It was man's judgment, man's perseverance, which wrought this change. I mention this, not to disparage their character, but to prove what I shall point out to you. The Merino is just as capable of being transformed into an average weight of 180 to 200 pounds, as to mark the standard of 100. In Wisconsin we never sought to accomplish this object. If anything, we discarded the tendency of this growth. Our selections were aimed to meet a popular craze, a thick set, short legged, heavy folded and wrinkly institution. We disregarded the laws of nature in this superfluous accumulation of skin, wrinkles and folds. Our experience told us that we lost constitution by forcing the animal to generate heat to protect its flabby hide from the frosts of winter, but we bred to sell and every wrinkle was supposed to be worth a five dollar bill. This is no statement of guess-work, for I have been there. I was raised in a thoroughbred sheep-fold and helped breed these wrinkles; but we have got to the end of this curse to the fine wool interests. A reaction has come, and at last common sense will assert its dignity, and this false doctrine must step down and out. We now have no use for it, and there never was but to sell. The demand of the people is for a more perfect construction of all the functions governing the true progress before us. We must economize not only the feed products, but upon nature's natural tendencies.

Old Spanish Flocks.—For a moment let us go back and notice the old Spanish flocks in the prosperous days of Spain. They were the pride of the nation. They had produced in that single development of fine wool a monopoly in the markets of the world, lest other nations should obtain of their flocks and come in competition. Strict laws were enacted to prohibit any to go out of the realm, but the disaster of wars scattered their Cabannas, and the Selicians, the Saxons and the French Merinoes sprang into existence, and although we regard these strains of breeding as offensive to the Spanish, yet they trace to the same stock, the same breeding, the same blood. The Saxons even rivaled the Spanish flocks in their fineness and delicacy of fibre. The Selicians were of the same character, but with the French a different type almost immediately sprung into existence. The people of France lived more for their taste of mutton than for the character of wool. So well did they succeed that 200 pounds became the standard, and to-day their sheep form the basis of the flocks of the Pacific States. They are handled in flocks of thousands. They have all the requirements of climate, of range, of scanty subsistance in times of drouths, and produce a merchantable wool and a mutton that is not excelled by any breed, no matter what claims, and but for our foolish and inconsistent craze we might have had to-day a perfect development of nature's gifts. Pedigree was the wild shout which echoed and re-echoed from Vermont to Wisconsin, and with that pedigree we saw only a bundle of wrinkles, a mass of vanity and the worst form of development which it was possible for us to breed. Pedigree is valuable just in proportion as it is properly applied; alone it can never succeed, but will pass into degeneration and ultimate defeat. I do not wish that you should understand that I place no value upon the pedigree of a sheep; it is our farthest intention to produce this thought, for we do believe that pedigree is valuable according to the value of the ancestors through which it would trace. But the ancestral blood had been at one time the pinnacle of fame, and yet the line of breeding from that point to this had been a course of degeneration. We would spurn its breeding as unworthy the patronage of the present time. Pedigree alone will ruin the best flock in existence, or, properly applied, will build up the poorest. It may represent vanity instead of substance, or imagination instead of reality.

A Change Must Come.— It is evident that a change must come. We have gone to the farthest extreme of human indurance. We have humbugged and sold until we can sell no more. By the force of circumstances we are compelled to yield to the demands of the times. This is the cause of the general dissatisfaction of the many. A low price for wool and a low standard of mutton bring us into disrepute. Correct this evil, and we shall cease our grumbling and appreciate our industry.

Hints on Crossing.— I would not suggest that you cross your Merino ewes with a hydraulic ram, but cross them with the skill of your own studied judgment. It is for you to say whether it shall be profitable or unprofitable. It is for you to say whether this great industry of the people shall stop at the bottom, where you now find it, or whether you shall lift it up, give it encouragement, sustain its character and mould it into the grand development which it is capable of giving. Cheap lands, as we find from Texas to Montana, can compete with the world in the production of wool on a small scale; but wherever land is worth from $40 to $50 per acre, we cannot afford to waste our raw material. As the dairyman studies his economy, so must we study ours. The future Merino must stand clear cut as a Durham, no wrinkles or folds, weight 200 pounds, fleece without jar, and fibre fine in texture. Had this been our aim when Hammond made the wonderful change, as wrought in his day, where might not we be to-day; but we have the strength of a grand foundation; we have the strength of a perfect system of breeding; we have the strongest character in all the breeds, and it only rests with us to solve the possibilities which lie before us.

Remember, we have passed that stage where wool alone will meet our wants. We must economize in every branch of industry, and nowhere in this grand country of ours is there so broad a place for profitable improvement as in the American Merino.

TO BEGINNERS IN SHEEP HUSBANDRY.

By HARRISON COLE, Dane County, Wis.

Sixth Paper.

Object of This Paper.—It is easy to smite the one that is down, whether it be man or beast, and just now there seem to be a good many trying to bring themselves into prominence by kicking a sheep. Yet, as I believe there is no other animal that contributes so largely to the comforts of man as the sheep, I, for one, shall stand by him. This paper will be devoted to the interests of the new beginner, which is the most critical time for the sheep husbandman, because, if he does not start out right, he is apt to lose money, get discouraged, and give up the business.

Choosing the Breed.— The new beginner must decide what breed he wants; that depends on what branch of sheep husbandry he intends to follow. If he wishes to raise lambs to sell at from eight to twelve weeks old, he must have one or both parents of the coarse wooled variety for the sake of early maturity. If your object is wool and mutton, there is no breed that is equal to the Merinoes. They will herd in large flocks better, and do well on less feed than any other breed. In starting a flock, it is generally the most profitable to buy the best of the kind, but if you lack means, the next best thing is healthy old sheep from a large flock. Put by themselves, they will often renew their age, and prove not a bad investment, but avoid young or middle-aged culls; they lack constitutional vigor, and are the most worthless stock one can purchase.

Breed to a Fixed Type.— Having selected your breed for a specific purpose, press steadily forward, having a fixed type of your breed in your mind, and constantly breed to it, and keep a sharp eye on the men who have made a success of the business you have chosen. Do not mix a little of this breed and a little of that, thinking to get a perfect flock. I have known men to try this, but not one to succeed. If you cross, let it be for a special purpose, and do not breed from the cross. I believe this a good rule to follow with all domestic animals.

Vicious Rams.—Although the sheep is a mild, docile animal, a vicious, ugly ram is a terror, and you should not allow a young one teased, or fooled with, as rams easily contract bad habits, and when vice is once fixed, they are nearly worthless, unless one could confine a few of them with those persons who are so anxious to destroy our wool industry, who would soon cry for protection.

Feeding for Market.—For the past nineteen years I have, to some extent, followed feeding sheep, or fattening them for market. During that time, I have bought a good many flocks of sheep, picked out those that would do to feed, and kept the remainder from one to three years—until they were matured—and then turned them off.

This has given me an opportunity to test the different breeds kept in our vicinity, viz.: the Merino, Cotswold, Leicester, Shropshire, and a few Southdowns. This latter breed, is now extinct in our vicinity, so far as I know· These other breeds, are, as in their order named, for profit, according to my experience.

Coarse and Fine Wools.—I wish to give you a few figures. The pasture and feed that will keep eighty coarse wools, will keep one hundred and twenty fine wools. We will take wether lambs and keep them until they are four years old. The coarse wools will shear five pounds each, or four hundred pounds each year, a total of sixteen hundred pounds in four years, which, at 30c. per pound, will bring, for wool, in four years, $480.

The fine wools, will shear seven pounds each, or eight hundred and forty pounds each year, a total of three thousand three hundred and sixty pounds, in four years, which at 28c. per pound, will give you $940. We will now sell them. If you sell immediately after shearing, and each flock is equally fat, they will sell for the same price per hundred; if you sell from the first of January to the first of May, there is no sheep that sells in the Chicago market equal to the Merino.

The coarse wools ought to average one hundred and forty pounds each, which at 4c. per pound, would be $5.60 each, or $448 for the flock. Add this to the wool obtained from the same flock, and you have a total for both wool and mutton, of $928.

The fine wools ought to weigh one hundred and twenty pounds each, which at 4c. per pound, will give $4.80 per head, a total of $576. Adding this to the wool of the same flock, gives $1,516, a difference of $588 in favor of the fine wools; and I think I have given the coarse wools the advantage, if anything, in these figures.

Fine Wools for Money.—I live in the banner sheep town, of Dane County, and there are but few who have not dabbled with the so-called mutton sheep, at one time or another in their lives, and I have yet to learn of one who made money at it, while the fine wools have been the main prop to many of our most successful farmers. Our soil and climate seem well adapted to the Merinoes, which have improved so much since they were first brought here from Spain, that one would hardly recognize them as belonging to the same family.

Personal Experience.—When I first commenced keeping sheep, I was prejudiced against the fine wools; this prejudice cost me a good deal of money. My flock got to shear less than four ℔s. per head. I was disgusted, bought a full blood Merino ram that, when mature, weighed 185 ℔s. and sheared 24 ℔s. of wool, for which I paid $37. I soon brought up my flock to six ℔s. each. I then had two hundred sheep. I think the profit on that one ram was at least $500, and I have since bred as large, broad backed, long wooled sheep, as I could find of this breed.

John Johnston's Experience.—In looking over Randall's Practical Shepherd the other day, I saw a letter from John Johnston, of Geneva, New York, one of the most successful and practical sheep men this county can boast of, who, after thirty years experience, chose full blood Merinoes for feeding purposes. He knew what he was about.

I have been thus lengthy, because most men sooner or later stumble on this point.

Hints on Lamb Raising. — The raising of lambs is an important factor in sheep husbandary. I will give a few suggestions that will be of advantage. First, sort your sheep every fall, putting only those that show good flesh and vigor into the breeding pens. The weaker ones, turn with your lambs, first putting a permanent mark on all that are two years old and over. Not breeding from them, they will be apt to flesh up the next season, and then is the time to ship them. In a wild state, the weaker ones would die off, leaving only the more vigorous ones to perpetuate the race. You secure the same result by sorting them. I would also put the non-breeding mark upon all goitered, stiff-necked and puny lambs.

Weaning.— Lambs in large flocks should be weaned when they are four or five months' old, and placed on good, succulent pasture. There is nothing better than a stubble field, with a good growth of young clover (something we have not had for the last two years). Feed a little grain as the feed begins to get short, but a trifle at first; new beginners are apt to fail in this respect.

Dry Feed — Salt and Water.— All sheep should become accustomed to dry feed by degrees, that is, brought in nights and fed, and turned out to graze during the day. Particularly is this the case with lambs. I have lost money at different times by not doing so. All sheep should have free access to salt and water.

Fattening.— I will now make a few suggestions as to fattening sheep. A restless, uneasy animal will not fatten. The first requisite in all fattening animals is peace and quiet. This, all will admit, but how to secure it is not at all times an easy matter. I used to wait until the fore part of winter, prepare my yards, gather in my sheep from where I had bought them, and commence feeding. There were sure to be a few wild ones that would jump and run at the least provocation, which would keep the flock restless and uneasy. I would have hard work to make the flock hold their own, for the first few weeks, while some would fall away.

I next tried letting them run out, coming into the yard during the day if they would, and at night I would shut them in and feed them. This worked better, but was not altogether satisfactory. The sheep being in a strange place, it caused more or less commotion driving them into the yards. The next season I bought and took home my sheep while the feed was yet good in my stubble; turned them near my barns, salted them a little, and, afterwards, to get them used to me, as the feed commenced to fail, I fed them a little grain and put the best hay I had in their racks to tempt their appetites. The result was, I had the heaviest and by far the fattest car-load of sheep that was ever shipped from our market. I have often tried it since, and think it the best possible way to handle a flock of sheep.

The Best Age.— I am often asked at what age do sheep fatten best. I think three, coming four, but all the way from lambs to that age you can pick out sheep that will feed well. I have had good success with lambs, turning them off at ten months' old, but the man who succeeds with sheep must not expect to get something for nothing. It is a profitable animal that pays well for good keep and care.

Rules for Feeding.— Always feed grain in a flat-bottomed, dry trough, if possible, a trifle at first. Increase until you reach to one and one-half pounds each, per day. In damp, muggy weather feed lighter. Be sure and not feed so as to have them leave grain in their trough. Do not disturb them in the morning; let them get up of their own accord and pick around a little before you feed them, like an indulgent mother with her lazy boy. If they do not get up in time for breakfast you must keep it waiti: for them.

Mixed Grains.— I like mixed grains for sheep better than to feed them all one kind, and in coarse feed give them as great a variety as possible, but the same kind at a stated time each day.

Catching.— In catching sheep, be gentle and careful. It does not hurt me quite as bad to see a man catch both his hands into the wool of a sheep as it would to see him snatch his wife by the hair, but it is only in extreme cases that either is excusable.

Feeding Racks.—The best rack I ever saw for feeding sheep hay, and saving your fodder, is made by sawing six inch boards into pieces, two feet and a half or three feet long, and nailing them at each end to two by four scantling, leaving a space six to eight inches between pieces.

Fleeces.—One word about wool, and I am done. A sheep that is in good flesh when it is sheared, and is kept so until it is sheared again, being kept in out of the storms during the time, will produce as good a fleece as it is profitable for *that* sheep to produce on this soil, and in this climate. A sheep that is fat in the fall, allowed to get very poor during the winter, turned to grass in the spring and allowed to gain before shearing, will be very apt to have a cotted fleece. He will at least have a rotton one.

Conclusion.—In deciding whether we can raise wool, or sugar, or any other product, let us not round up like a ground hog in his winter quarters, and say we can't, as some said of the rebellion, you can never put it down, and of our national debt, we can never pay it; but first let us ask, do we need those products, and have we the proper soil and climate to produce them. If so, then let us say, as we have said in times past, by the enactment of wholesome laws, and their proper execution, by a firm reliance on the sons and daughters of a free people, and the blessings of a bountiful providence, we will produce them.' Let us know no East, no West, no North or South, but one harmonious whole, and vote in the interests of our country. Then we will have in the future, what we have had in the past, the best country for a poor man to raise a family in and fit them for the stern duties of life, history ever recorded.

Discussion.

MRS. BARLOW.—I want to say, that from our grade Shropshiredown sheep last spring, we sheared 260 sheep, and they averaged eighty pounds to the sheep, and I sold my wool at twenty-five cents a pound, and if I had waited two days, I would have got twenty-seven. I am satisfied with Shropshiredowns. I will also say that I have thirty-four lambs which I expect to sell in the Minneapolis or St. Paul market this spring and realize at least $5. apiece for each one of them.

MR. ANDERSON.—I want to say a word for the mutton breeds of sheep. Mr. Cole, as I understood him, said that the coarse wool breed of sheep sheared about eight pounds on the average. Now, my experience is, they shear nearly double that. I had a good many last year that sheared over fifteen pounds apiece. I raise 100 per cent. of lambs from the ewes. Mr. Cole will raise 75 per cent. only from those small breeds.

I want to say to farmers who want to go into sheep husbandry, that they should get the fine wools if they want to, but do get the large breeds. If a farmer wishes to get a few sheep—fifty to one hundred, and I have one hundred in the same yard—let him have the mutton breeds. I had some last year that averaged seventy pounds apiece, and they sold at a good price.

THE COMING HOG.

By THEO. LOUIS, Dunn County, Wis.

Seventh Paper.

Improved Breeds.—It is not my aim to condemn in any wise any of the improved breeds, nor to recommend any particular breed that has been the laborious effort of time, patience, disappointment and success.

Great credit is due to the few master minds that laid the foundation to this great industry; that created from the original, an animal of early maturity and of such shape and build as to satisfy the most critical eye and call forth the admiration of the masses. Even Europe calls on her younger cousin to send back to her the animal that American genius has transformed into typical beauty and a profitable feeder, of early maturity, to improve her herds.

The Kind of Hog We Want.—But dare we rest here? The ever changing conditions of advanced civilization seem bound to say: "You have over-done, or you are overdoing your work." We neither want nor need the large, fat hog. We want the pig fed to lean and fat. The owners of our large pork-packing houses call for a hog of early maturity, that will supply the needs and wants of a foreign and home market. The refrigerators in the packing houses have enabled them to cure the pork with far more safety during the early summer and fall months than in the winter. By what right then dare the feeders and breeders ignore the loud call of foreign exchanges, and the capricious appetites of all classes, from laborers to millionaires? The ever arising question of the day is: "How can we increase export and home consumption, to benefit ourselves, the State, the nation?"

Our Export and Home Demand.—No nation on the earth is better situated to fill this want than the American farmer. We have as large resources for lean and fat as we have for fat alone, and soon some intelligent, thinking farmer will try to meet the demand, even be it at the sacrifice of that typical form, to some degree. We are repeatedly cited to the fact that on the British Isles a strenuous effort is made in the various packing establishments to increase, and convert into hams and bacon, the greater bulk of their pigs, and they consider that at the present time they are competing successfully for texture, flavor and proportion of lean meat with any manufactured in Germany, Holland, Sweden and America.

Shall We Hold Our Own?—And here is an open question: "Shall we be able or willing to hold our own?"—nay, more—to increase our export and home demand for young, juicy and lean pigs for our bacon curers? At present there is but a limited supply of the entire hog product considered a first-class article for that purpose. Our packing and curing houses can only get that class by selection; seldom, if ever, are they offered in car-load lots.

In our own State, we raise nearly a million and a half of hogs, and nearly one million of them are wintered, at a cost of nearly $3,000,000 in food consumed without any material gain in weight, with an aim to increase in size, weight and age—to make the hog a lard cask of ponderous weight at a material increase of cost to the owner, it being a well known fact that it takes one per cent. more of food to the live weight to make one pound of gain. In other words, it takes a greater amount of food to sustain life in the older and larger animal.

THEODORE LOUIS.*

While it has been demonstrated that we should suit the requirements of the market and taste, it will be no drawback, so far as pounds and numbers are concerned. We ought to be enabled to ripen double the number of pigs and more pounds at less cost. The farmer himself is not willing to keep for his own home consumption the animal of large weight and excessive fatness. Why should he wonder, and call it a capricious taste in other classes?

Exports.— There has been a steady increase in the annual export of pork since the year 1821; at that period the exports being $1,254,116, while during the last twenty years the average annual exportation, including hogs with pork product, has been 530,000,000 pounds. If 200 pounds be taken as the average requirements of hogs for exportation, the number has been 2,650,000.

Home Consumption.— The annual home consumption of pork during the same period of time has averaged 4,000,000,000 pounds. The average production for twenty years has been 3,530,000,000, of which 15 per cent. has been exported.

Cheaper Production.— By giving the above figures, taken from the Cincinnati Price Current, of April 22d, 1886, showing the amount of hog product, its export and home consumption, may it not be a stimulant for the active, thinking farmers who feel willing and have the adaptability as to the feeding and breeding of swine for profit, to solve the problems and questions of greater profit by cheaper production, increased fertility of soil and producing as a specialty what the market calls for, and thus be instrumental in increasing export? The time has not come, and probably never will come, when the large number of feeders will desist from exclusive corn feeding, as the crop is so easily obtained and fed, and they will ever look with suspicion on the farmer who pursues a more economical method, considering it an increase of labor without gain in compensation.

It is said that only certain breeds will answer for the coming hog. It may be and probably is true, that by breeding and feeding we may stimulate a tendency to lay on fat even though the food may not be of that nature to produce fat. If this be true, and it undoubtedly is, if we would strictly adhere to the principle, to feed and rear the breeding stock on either side with a flesh forming food, by liberal feeding and good care we would have hogs of early maturity.

---

*Theo. Louis, was born in the city of Duisburg, on the Rhein, Germany, December 4, 1829; received a common school education; by occupation a silversmith. Came to this country in 1848, as a fugitive, having taken part in the revolution of 1848; landed in Milwaukee July, 4th. There being no employment in his occupation, he went to Two Rivers; worked at lumbering, being employed as second engineer in the mills. From there went to Watertown, worked at distilling. In 1850 went to Galena, Ill., and worked at his trade; from there went to St. Louis and engaged to Prince Nicolas, of Nassau (Germany), and made a trip through the plains and Rocky Mountains, and remained with the American Fur Company at Fort John until 1854; returned to Wisconsin and pre-empted 160 acres of land, where he has resided ever since, as a farmer, and has made the breeding, raising and feeding of swine a successful specialty for a series of years.

But in all this, we should never lose sight of the fact that a breeding animal, selected for that purpose, should be capable of digesting and assimilating a large amount of food. The proportion of food required to supply the waste of the tissues and keep the animal machinery in working order is less than when a smaller amount is consumed. If other points are hereditary, this is one of the essential points.

Rearing and Feeding.— How shall we rear and feed the coming hog? Shall we winter him? I hear every intelligent farmer say, "No." Shall it be the early pig of March and April? Many will respond, "Yes." Let us consider the best way out.

The early March pig is subject to many dangers, at the tender age of infant life, in the hands of the average farmer, with few conveniences for proper shelter. But why is it that there is seldom, even on well regulated farms, any provision made for the animal that gives such large and quick return for food consumed and care bestowed? Think about it. Again, the early bred pig is ready for the market when the prices are the lowest and the markets glutted —November and December. This being true, it is also true that he excels his eighteen months old brother in cheapness of production, if left with the dam to nurse until twelve weeks old, she being liberally fed with a warm, well-balanced ration of shorts, oats and corn meal, with a ration of oil meal and a portion of bran, changed sometimes to corn on the ear, and the little fellows having access to some whole oats. Care should be taken to never overfeed the sow. Once off her feed, she will fail to produce milk, and it is often difficult to get her digestive and productive powers regulated again.

Clover and Peas.—The clover field must go hand-in-hand with good feeding, but on stormy days the litters are by far safer with plenty of green cut clover in their pens. By July there should be a field of peas, where they grow and do well, next to the clover field. A place should be provided where the little fellows will have access to them, or soiling with them should be resorted to, it being the more economical. At that time it will take less concentrated food at regular feeding hours. These last mentioned "regular feeding hours" are of vast importance. They should not be allowed to stray all over the farm and in adjoining wood lots. If confined at night to well regulated stables and well littered yards, we will receive a large return for food consumed in the most valuable manure. They should be promptly returned in the morning after feeding to their respective fields. Little, if any, manure will be lost, and so a steady increase in the fertility of the soil will be the result. By such methods of feeding during the summer, and feeding or ripening the animal on a nice food of squash, shorts, oats, peas and corn meal, while the bulky nitrogenous food has distended their stomachs, they will have carrying room, and will ripen rapidly into the desired coming hog.

But, far from being satisfied with the above result, indisputably true, we dare not rest here. The result achieved at our Experiment Station and elsewhere this past year, to preserve one of the most valuable foods for pigs—clover—in a green and succulent state in the silo, will open a wide and unexplored field for the coming hog; a field of greater profits with more certainty, and will gain a decided advantage over the marketing of the last method. From my own experience and that of others, I know it to be true that a pig or shoat can be wintered on clover hay, cut and moistened with either steam or warm water mixed with ground grain, at less than half the cost of the usual method of corn and water.

Value of Succulent Food.—It is not my place here to give the advantage gained in securing the clover crop over the old way, but to have from twelve to thirteen tons of green succulent food from one acre—food that the hog loves—opening a new era in the production of pork. First, it would enable one to breed in May or June, or in August, when there is little danger connected with breeding as to loss by over-laying by the sow, dying from thumps, or scours or chills. (The losses from this last source are often very large in cold and backward seasons); or by sows eating their young, by being constipated, being fed a highly concentrated or conbonaceous food. We shall have the advantage of two summer seasons of clover pasture, and peas and squash can be fed to great advantage to the young growing animal in the fall and early winter, while the clover ensilage mixed with cornmeal will give a well balanced ration toward the desired object—lean and fat—the coming hog.

Sleeping Quarters.—But one should not forget that when we feed a summer ration in the winter, sleeping quarters and shelter must coincide with it. Warm, well ventilated, clean quarters, free from dust and filth, are essential to the coming hog. When so wintered, on the cheapest of food, with a daily paying growth, he is ready, at the option of his keeper, to be fitted for April, May June, September or October market. If breeding sows are selected from August litters, so as to breed them the next season, it will help many to overcome the ruinous practice of breeding from immature stock.

Breed from Mature Stock.—Where swine breeding and feeding is relied on, on a larger scale or as a specialty, it should be ever the aim to breed from mature parent stock, and have litters come as near of one age or time as possible, so as to have the herd of like growth and size, ever trying to gain a reputation with pork-packing houses. There is, also, at our large cities, a large and profitable market to be found. It is as easy and cheap to preserve meats well as it is to preserve them badly, if we are furnished with good rules and observe them.

The hams of Westphalia and the bacon of Ireland are unrivaled in reputation. Why not equal or excel them? Little will be in the way of the progressive, thinking farmer of Wisconsin, with large pork-packing houses on the South, East and West borders, with large cities as great consumers, to make "the coming hog" a paying industry.

Discussion.

QUESTION.—I want to ask Mr. Louis how his clover ensilage is treated—whether as corn fodder, whether it is cut up and left in that manner, or whether it is laid two or three feet deep for heating, or whether it is filled right up to the top of the silo at once.

MR. LOUIS.—All we did was to take up the clover after it had been cut by the mower, put it on the wagon, draw it to the silo and left it until it was heated; then spread it around and put on some tarred paper. It was not much wilted.

QUESTION. Did you fill the silo in one day, or was it subsequently filled?

MR. LOUIS.—There was not enough clover to fill it; it all went in at one time. We have obtained 27,000 pounds of green clover from an acre, and I think the farmers may well consider the importance of putting clover into the silo. It is very valuable for hog and sheep feeding.

THE CHAIRMAN.—There has been a request that Prof. Henry have five minutes to tell us about his experiments in feeding hogs.

PROF. HENRY.—I wish to say to the farmers, that since at present we are the only experiment station in this country that is carrying on the work of experimenting in feeding hogs, I see nothing ahead of me but this work. I want you to remember that what we are doing now is only preliminary work. You must be patient, and not say "is this work practical." It is not practical at all, not directly practical. We have now completed our third experiment in the so-called feeding for fat and for lean. These pictures which hang about the room represent our third experiment. We have two experiments on the way. In the third experiment, we took one lot of pigs and fed them one part corn-meal, and three parts skim-milk. Another group got shorts, two thirds, and corn, one third; the third lot of hogs received nothing but corn-meal.

Now, the corn-meal fed hogs made a very heavy hog with a large amount of fat; the shorts ration made a small hog, the smallest of the three, but I think, all things considered, that the hog had the most lean meat; it had the most blood in it. We found in the shorts fed hogs, about three pounds of blood to every hundred pounds of live weight, while in the corn fed hogs there were only two pounds of blood, a difference of fifty per cent. Skim-milk fed in conjunction with the corn-meal made the largest hog, and the meat stood up well, although the fat was not quite so solid, as the pure corn fed. Figuring on the cost, allowing corn-meal at forty-five cents a bushel, and figuring skim-milk at twenty cents a hundred, and shorts at fourteen dollars a ton, the pure corn made the cheapest feeding. The skim-milk made the next, and the shorts made the most expensive.

I will say, that so far as our knowledge goes, there is nothing cheaper to-day for fattening a hog than corn, but we must not deceive ourselves upon that. While we will always feed a large quantity of corn, when it comes to growing our animals, and caring for our breeding stock, we must have clover. We must give them protein food. There is not enough ash material in corn to make the proper bones, and, as Mr. Louis suggests, if we will only feed phosphate rock or something like that to our hogs, something to give bone material, it will make up for that lack. To those farmers who can, I would say give your hogs blue-grass pasture and clover pasture. To the breeder of hogs, give them shorts, bran or something of that kind, but for fattening hogs give them all the corn you please. There ought to be as much variation in pork as there is in butter.

A gentleman in Chicago said: "I pay twenty-five cents a pound for all the bacon I eat. I would rather patronize home industry, but I cannot get any such bacon in America, and have to get it from across the water and pay twenty-five cents a pound."

Now, I will say, farmers, be patient with us in our experimental work. I think we will be on that work ten years yet, but I hope, when the time comes, that we will have enough return to warrant the expenditure.

We have two experiments now in progress on the farm. The first lot we are feeding, the main part blood, and I don't know but that is going to be the cheap food yet. It is being sold as a fertilizer. I don't know but we had better feed it first and use the droppings for manure, as we feed bran and use the droppings for manure. We are feeding peas. Any of you who will visit the University farm may see the two lots of hogs, and when you read the report next year, you will be familiar with the appearance of the animals.

SUPT. MORRISON.—Mr. Gregg, the Superintendent of Farmers' Institutes of Minnesota, has been with us during the entire sessions of this institute, and I would like to call him out and introduce him to our farmers, as they have been engaged in Minnesota in the same work that we have for the past three winters.

MR. GREGG.—Mr. Chairman, I appreciate the courtesy that calls me here just for a few moments, and it would please me very much if I had time to dwell somewhat at length upon the interests of the work as we have found it in our own State, because I want to say right here that we feel indebted to Wisconsin for that measure of success which we have already attained, and we hope, in the coming circuit that we shall commence on the 15th of May, that we shall be inspired with the enthusiasm and wisdom that comes from our sister State. We want to have enough of that self-confidence that always insures success, but we have not enough of the sublime quality that leads us to believe that we have grown to be as big as our mother Wisconsin. We are doing our very best, if I may use the expression, to "get there all the same," and I think we can safely say, in view of the circuit which closed last Saturday night at Mankato our winter's series of the institutes, that the work in Minnesota is well established upon a solid foundation, and we hope that in the future the work in our State will do as much for our agriculture as it has already done for Wisconsin. I believe that the people of Minnesota will come to appreciate that work better.

I think now is a proper time for me to say one word for the press of Wisconsin. The press of Wisconsin has been exceedingly wise; it has been loyal to her best interests, and the pages of her best papers have always voiced the glory of Wisconsin, and I hope the papers of Minnesota will learn to be as wise as they.

I wish to leave you with these few words; may the success of the past be far out-stripped by the success of the future, and we shall go back home with the very best intentions to make our success as great as possible for us.

SWINE-RAISING IN WISCONSIN.

By GEO. WYLIE, Columbia County, Wis.

Eighth Paper.

Hogs at the South.—A few years ago an enterprising Ohio swine breeder conceived the idea of working up a trade for his surplus stock at the South, and accordingly entered a few of his best swine for exhibition at the North Carolina State Fair. He was much surprised, after being on the grounds two or three days, to find that his fine pigs attracted no attention whatever, and more so to find admiring crowds around the pens containing native specimens of the true "elm peeler" type exhibited by the North Carolina farmers. Our Ohio farmer finally approached a native "tar heel," and asked: "Why is it that those 'razor backs' over there attract so much notice, while these wide backed, heavy quartered, short legged pigs of mine attract no attention whatever?" The "tar heel" rolled his quid from one side of his mouth to the other, looked wise, shut one eye, squinted at the Ohio man with the other, and said: "Stranger, we uns can't make nothin raisin no hog that can't run faster nor a darkey!"

Our Ohio friend found he had been breeding in the wrong direction to supply that particular market; he had been breeding a hog that gave the largest returns in weight for the feed consumed, while the North Carolina farmer wanted a hog with good wind, long legs, and capable of covering twenty feet at a jump—an animal in fact whose greatest recommendation was running fast.

Hogs in Wisconsin.—In Wisconsin we haven't the darkey to contend with and have made very great improvement in the quality of our swine in the past ten or fifteen years. Still we have altogether too many farmers who keep swine better adapted to running, than making pork. The successful breeding of swine needs constant care and watchfulness, and here is where the average farmer fails. The tendency of all swine is to revert back to the original type, and it is only by careful selection of the best, and by judicious mating in the hands of experienced breeders that they are improved or kept at their excellence. The generation of swine is so short, they increase so rapidly and reach maturity so quickly, that they furnish plainer lessons and demonstrations of the science of breeding than any other class of live stock.

Difficulties to Overcome.—The young man anxious to become proficient in cattle breeding could obtain valuable information by practicing with swine for a few years, and even the horse breeder (if he would only condescend) might learn here in a short time things pertaining to the breeder's art that have taken him a life time to learn by actual experiment. One of the greatest difficulties to successful swine-raising among our average farmers is that they persist in regarding swine as hogs, and in treating them as hogs. They are usually considered as being a step lower than anything else on the farm; they are made to rough it around straw-stacks, and act as general farm scavengers. Where they are kept at least on an equality with other farm stock, the income from their product is found to be more than correspondingly increased.

Points of Excellence—The Head.—In the limited time at my disposal, it is impossible to go into details of the different points that go to make up a first-class hog. But I will allude briefly to a few important qualifications. In selecting an animal, the head is an important index to the character of the beast. A horseman would scarcely buy a horse without looking at his head, and cattlemen are always talking about "mean" heads, or "sweet" heads, but I believe in the hog's case the head is a surer indicator of the qualities of the animal than in either of the other. If you want a hog that is never satisfied with what you give it, and is always looking around the fence for a hole to get out, get one with a long sharp nose, and narrow between the eyes. But if you want one that will eat what you give it and lay down satisfied, get one wide between the eyes, with a short nose, and a face slightly dished·

The Legs and Back.—The front legs set wide apart indicate constitution and vitality. He should have a wide, straight back, with a well sprung rib, and be well filled out around the heart. The limbs should be strong and tapering, made for holding up weight rather than moving fast.

There are many other points that a breeder would consider, but if the average farmer has swine with these points well developed, he can rely on having those that are at least profitable feeders.

Improving Breeds.—Having such a hog, the question is, how shall we hold him at his present excellence, or if possible, improve him. If your hogs are Poland Chinas or grades of that breed, then get the best pure bred sire of that breed obtainable; get him strong in the points that your present stock lack, and keep right on in that line. If your stock is some other breed, and you are satisfied with it, do the same. There are enough different types of the same breed in any of our improved breeds of swine to supply any variation that may be necessary, and with far better results than if the type wanted were taken from a different breed.

Crossing.—"Don't make hash of your breeding," is just as applicable to swine as to anything else. Good results are sometimes obtained in swine raising in the first cross, made by breeding together pure bred animals of two distinct breeds. While this is true of the first cross, the identity of the bloods become last in the next cross, and they quickly lose the characteristics of the original stock and degenerate rapidly. The infusion of fresh blood from either of the original breeds, or from some other pure breed, does not appear to have the good effect on stock thus bred, that it has in other cases. Thus what is gained in the first cross is lost in the subsequent ones. The only excellence then is in the first cross but the additional expense of keeping two' distinct breeds, so as to always have the benefit of that first cross is not compensated for in the increased excellence of the stock. Conditions and circumstances have given the United States the best swine and the best breeders of swine in the world. And they have perfected a breed, or several breeds for that matter that, each in itself distinct from all other breeds, can give as large or larger returns, and with more certainty than can be made with any cross or grade. And these breeds are all easily obtained. Life is altogether too short, even when swine breeding is considered, to waste time in aimless crossing together of different breeds, or in using an animal of one breed one year and another the next.

Feeding.—The proper feeding of the right kind of food cuts a greater figure in breeding good stock, especially swine, than most farmers appear to think. With improper food, the best pigs of the best breed in the world can be ruined in a single generation. For substantial proof of this assertion, I have only to cite you to the most valuable feeding experiment ever made in the United States. I refer to Professor Henry's recent experiment in "feeding for fat and lean." Here we have a practical and conclusive demonstration of the injurious results of an exclusive corn diet. Had those corn-fed pigs been reserved for breeders, and bred with stock fed in the same manner, would it be any wonder if their stock should lack constitution and vitality? Yet those pigs were fed just as thousands of our farmers feed their breeding stock, and when their pigs die of fatty degeneration when young, or become victims of cholera when older, they call it bad luck, when the real cause, nine times out of ten, could be directly charged to feeding the stock and their ancestors too heavily on corn. No pig intended for breeding purposes should ever he fed over one-third of its entire ration on corn. While corn is just the thing for finishing up animals intended for market, its lack of muscle and bone forming material makes it ruinous for those intended for breeders. As a feed for a growing animal it is lacking in the material necessary for a good strong foundation, and does not furnish muscle enough to hold the structure together.

Keep Mature Brood Sows.—Another important point in maintaining the quality of your swine is to keep mature brood sows. They raise stronger and healthier pigs, and more of them at a given age; and your breeders for the coming year should always be selected from that class. Young, half grown brood sows, with corn for feed, are sure to bring disaster in the end.

Farmers who rush into swine when pork is high and out of swine when pork is low, seldom make any money in the business. But the farmer who keeps at it for a term of years, breeds and manages them intelligently, will find that they bring larger and quicker returns for the money invested than any other class of live stock.

PLAN FOR A MODEL HOG-HOUSE.

The following admirable description of a model hog-house is taken from the fifth annual report of the Wisconsin Experiment Station, to the Director of which I am indebted for the use of the cuts herewith. It was prepared by Mr. L. H. Adams, Farm Superintendent:

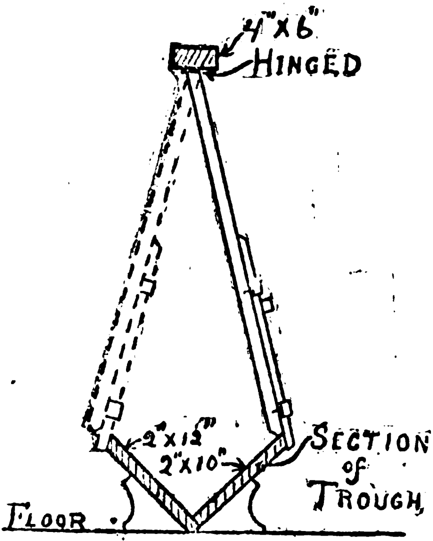


FIG. 1.

It will be borne in mind that this hog-house is arranged especially for feeding experiments; the practical breeder and feeder can introduce such modifications as will meet his requirements. By referring to the ground plan it will be seen that the dimensions of the building are 70x24 feet, outside measurement, with 16 foot studding. It should be placed with its greatest length east and west, with sleeping rooms and yards on the south side for sunshine and warmth. At one end of the building a weighing and store-room is entered through a door sufficiently wide to admit a swill cart. This room is 13½x24 feet, and is provided with a chimney and all the facilities for heating water, weighing hogs, etc. A feeding alley four feet wide leaves this room and extends the entire length on the north side of the building. In the plan as here given, there are seven pens, each seven feet nine inches wide in the clear; a tight partition reaching to the ceiling, 6 feet 11 inches back from the feeding alley divides these pens into two apartments, and the feeding and sleeping rooms. This partition also serves to support the joints for the upper floor.

It will be observed that no more space is given up to the feeding rooms than is absolutely necessary, as the hogs are driven back to the sleeping rooms after each meal through small doors (designated by dotted lines in cut No. 2) that slide up and down in grooves and are operated from the feeding alley by means of ropes that run over two small pulleys screwed into the ceiling. A large entrance to each of the sleeping rooms is also provided, so that an attendant may enter any pen without disturbing the occupant of the adjoining ones. The partitions that separate the feeding rooms from each other are three feet high. A series of doors, three feet wide, through each division, afford a satisfactory means of handling the hogs, either on the scales, or when loading them into wagons at the opposite end of the building.

A very convenient device for keeping the hogs back from the trough when pouring in swill (see cut No. 1), needs only to be seen to be understood and appreciated. It is a simple door hung over the center of the trough that swings and catches on either side of it by means of a wooden bar that can be raised up and down through iron staples. A 4x4 is sufficiently strong to support these doors; in the cut it is represented as 4x6 through mistake.

We now come to the sleeping rooms, and as these are where the hogs spend most of their time it is important that they receive careful attention. These rooms are eleven feet five inches by seven feet nine inches, inside measurements, and occupy the southern portion of the building. Each room is ventilated by means of a shaft two feet square, that reaches from the ceiling to within three feet of the roof (see cut No. 3). From this point the foul air escapes through a ventilator on the top of the building; the draught is regulated by means of a sliding door at the bottom of each shaft. By making openings into these chutes in the upper story, an excellent means of distributing bedding to any sleeping room is provided. Sunlight enters the sleeping apartments through windows four feet wide and two feet high.

We now come to another important feature of the building that must be considered in connection with the sleeping rooms, for they should always be together. I refer to the series of yards on the south side of the building. Each pen has a yard in connection with it that reaches back sixteen feet. Constant access to this yard is had by means of a small door that is left open all the time, unless the weather is very cold, so that all droppings may be deposited outside of the building; this will be done if the yard is not allowed to become clogged up with litter and filth. The outside fence of this yard is made permanent, with a substantial gate hinged at each end (see cut No. 3); the division fences are made so that a ten foot panel may be lifted out to allow a wagon to pass through and gather up the manure. It is not advisable to have these yards reach back more than sixteen feet on account of the extra work in keeping them clean and gathering up the manure.

Mr. Theodore Louis, a prominent and successful swine breeder of this State, has suggested that these yards be floored with plank laid in water lime, in order to keep out vermin and reduce the loss of manure to the minimum.

Now a word about the height of the building. Our farmers are coming to learn that the foundation, floor and roof of a structure are the expensive portions, and, as storage capacity is always in great demand on the farm, why build a one-story hog-house when a little more outlay for boards and studding, gives such a large upper room for bedding? or if not wanted for that, it will be an excellent place for storing farm tools away for the winter, plows, harrows, cultivators, and those ...ls that are only used for a

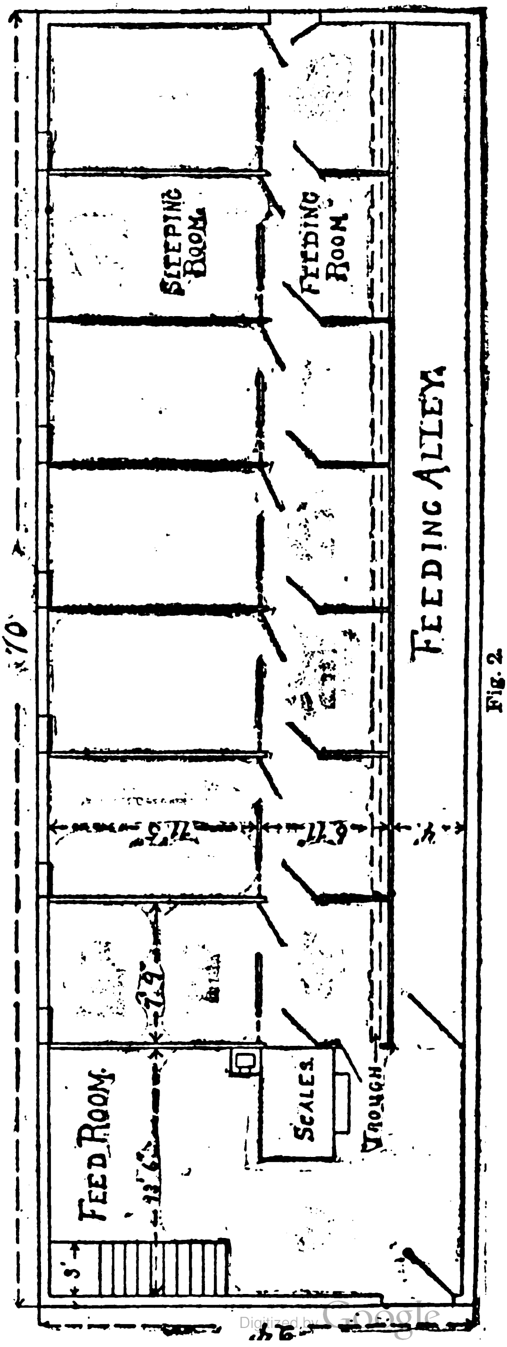


Fig. 2

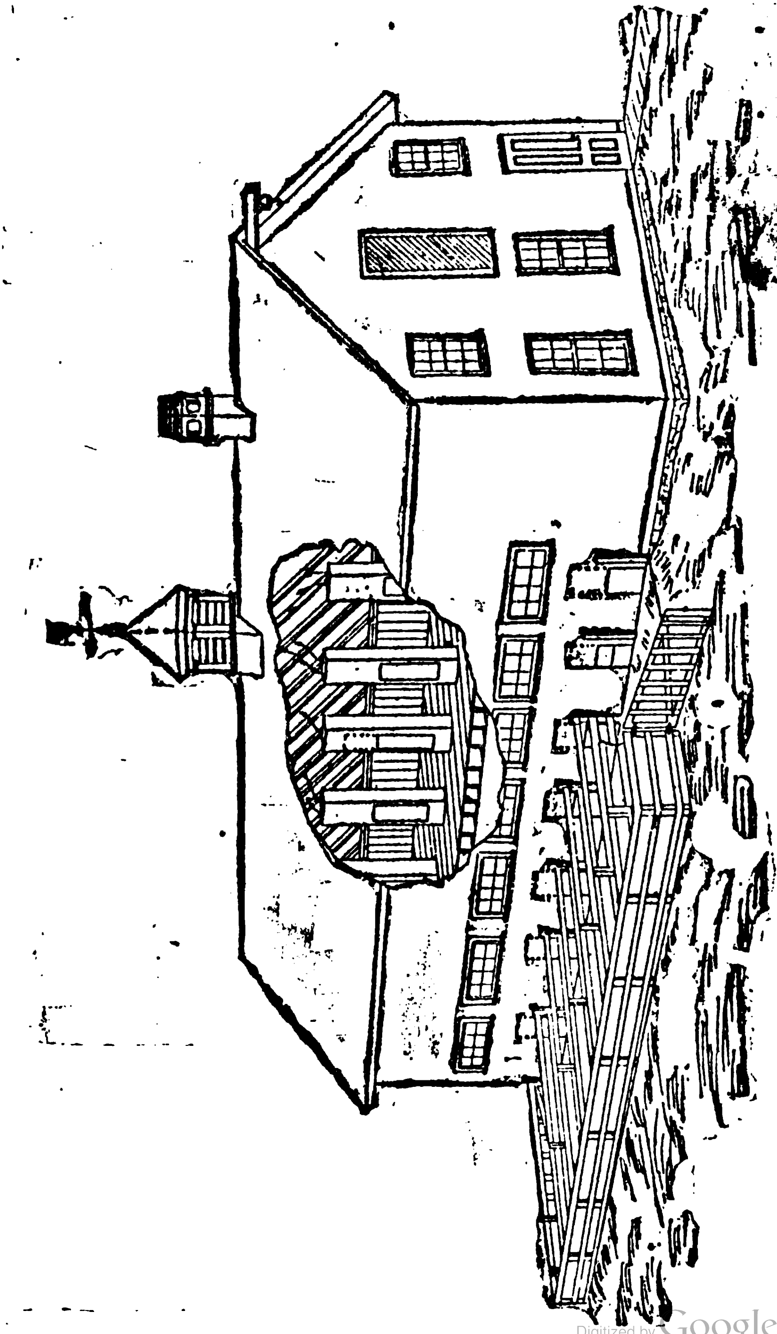


Fig. 3.

To sum up, the features of this building which we wish to emphasize are:

1. The manner of separating the sleeping rooms, which insures a clean dry place to feed.
2. The facilities for ventilation and light.
3. The system of yards by which the sleeping rooms are kept clean and the hogs permitted to have exercise at will.
4. The details of the interior arrangement such as the width of pens, disposition of doors, etc., may be varied to meet the requirements of the builder.

RESOLUTIONS.

The following resolutions were introduced by Hon. H. C. Adams:

Resolved — That the generosity of the railway companies doing business in this State in granting a half-fare excursion rate to this institute is fully appreciated by those in attendance, and for the courtesy and consideration received we hereby return our most earnest thanks.

Resolved — That President T. C. Chamberlin be requested to correspond, in our behalf, with our Senators and Representatives in Congress in reference to the transfer of the United States Weather Service from the military to the agricultural department, and also with the authorities in charge of the weather service, with a view to securing such a reorganization and extension of the service as shall give greater precision and local adaptation of the weather forecasts, and their more complete utilization.

Resolved — That the broad comprehension of the needs of the farmers of this State, and the strong executive ability manifested by W. H. Morrison in supplying those wants in the line of plain, practical, effective educational work in the Farmers' Institutes, have been strikingly exhibited in all the arrangements for the instruction and comfort of this convention, and that we hereby pledge to him our active sympathy in developing the farms and the farmers of this splendid commonwealth

CLOSING REMARKS.

By the Superintendent.

The program of the last of a series of eighty-one institutes held in different parts of the State is completed, and I hope the suggestions, comparison of methods and exchange of ideas will stimulate and inspire the farmers of the State to more systematic business ways on the farm. I know many go from these gatherings apparently more reliant and stronger, thinking more of their farms than ever before.

The farmer is one of a class of workers that is isolated, and he needs to learn from and by the work of others. We have often heard it said that "the man who makes two blades of grass grow where but one grew before" is a benefactor to his race. But what praise and commendation will you give to Hiram Smith, C. R. Beach, Theo. Louis, W. D. Hoard, J. M. Smith, C. P. Goodrich, F. C. Curtis, and a host of others, who have not only doubled the grass crop and the products of our domestic animals, but who willingly teach others to do the same by their example and advice.

The institute spirit will eventually permeate every farming district in the State; will increase our wealth, educate our farmers, bring them into sympathy with our State University and make them proud of its advantages.

I feel exceedingly thankful to the farmers of the State for the assistance they have given me, knowing that many of them have made sacrifices in furthering this great educational work; but they have the satisfaction of knowing that he who goes into a locality where agriculture is backward, and by better methods of farming doubles or trebles the ordinary products of the farm, patiently and unselfishly giving his experience to inquiring neighbors, is a nobleman of the highest degree.

I hope that the day is not far distant when, instead of eighty institutes, we shall have five hundred scattered all over the State, and that the mutual inspiration and stimulus which will come from this contact and exchange of ideas will dignify and exalt farming, make better farmers, better homes, and better citizens.

THE CHAIRMAN.—With this, the last of eighty-one institutes comes to a close.

FINIS.

A Great Railway.

The Chicago, Milwaukee & St. Paul Railway Company now owns and operates fifty-six hundred and seventy-five miles of thoroughly equipped road in Illinois, Wisconsin, Minnesota, Iowa, Missouri and Dakota. Each recurring year its lines are extended in all directions to meet the necessities of the rapidly populating sections of country west, northwest and southwest of Chicago, and to furnish a market for the products of the greatest agricultural and stock raising districts of the world. In Illinois it operates 316 miles of track, in Wisconsin 1,309 miles; in Iowa 1,572 miles; in Minnesota 1,122 miles; in Dakota 1,216 miles; in Missouri 140 miles, and the end is not yet. It has terminals in such large cities as Chicago, Milwaukee, La Crosse, St. Paul, Minneapolis, Fargo, Sioux City, Council Bluffs, Omaha and Kansas City and St. Joseph, Mo., and along its lines are hundreds of large and small thriving cities, towns and villages. Manufacturing interests are cultivated, and all branches of trade find encouragement. The Railway Company has a just appreciation of the value of its patrons, and its magnificent earnings are the result of the good business tact which characterizes the management of its affairs.

The popularity of the line is attested by the fact that notwithstanding the strongest kind of competition of old and new lines, the Chicago, Milwaukee & St. Paul Railway continues to carry the greater portion of all the business between Chicago, Milwaukee, St. Paul and Minneapolis. It is the best patronized route between Chicago, Council Bluffs and Omaha and to and from all points in Wisconsin, Minnesota, Dakota and Iowa, and its Kansas City and St. Joseph line will undoubtedly take equal rank with the older lines leading to and from the Southwest.

On all its through lines of travel the Chicago, Milwaukee & St. Paul Railway runs the most perfectly equipped trains of Sleeping, Parlor and Dining Cars and Coaches. The through trains on all its lines are systematically heated by steam. No effort is spared to furnish the best accommodations for the least money, and, in addition, patrons of the road are sure of courteous treatment from its employes.

S
12
.F3

WISCONSIN

890

Farmers' Institutes

1889.

BULLETIN No. 3.

EDITED BY

W. H. MORRISON, Superintendent.

MADISON, WISCONSIN.
1889.

WESTERN FARMER CO., . . .
. PRINTERS AND PUBLISHERS, .
. . . . . . MADISON, WIS.

TABLE OF CONTENTS.

Page.
Small Fruits on the Farm, by C. H. Hamilton 3
The Farmer's Fruit Garden, by Geo. J. Kellogg 7
Signs of Progress in Horticulture, by B. S. Hoxie 12
Decorative Horticulture, by James Currie 14
Soiling vs. Permanent Pasture, by Hon. Hiram Smith 17
Practical Experience with Ensilage, by Weldon Van Kirk 24
The Profits of Dairy Farming, by S. A. Gernon 30
Dairying and Beef Production, by C. R. Beach 33
Advantages of the Creamery System, by A. R. Hoard 39
Advantages of Cheese Production, by T. J. Fleming 43
Farming to a Purpose or at Cross-Purposes, by Hon. Hiram Smith 45
How to Make Brick Cheese, by T. J. Fleming 51
Dairy Farming, by Prof. Jas. W. Robertson 54
The Elaboration of Milk and Butter Making, by Prof. Jas. W. Robertson 60
Feeding Hogs to Produce Best Results, by Theodore Louis 62
The Science of Pig-Feeding, by Geo. McKerrow 64
Care of Brood Sows and Young Pigs, by Geo. Wylie 67
Feeding Swine for Market, by Thos. Convey 69
Can We Grow Beef Profitably on High-Priced Land? by H. C. Thom 81
Management of Pregnant Animals, by Dr. V. T. Atkinson 84
Care of the Brood Mare, by A. O. Fox 86
Breeding Draft Horses, by S. D. Thompson 92
The Farmer's Horse, by J. M. True 98
Raising Sheep for Mutton, by Geo. McKerrow 101
Poultry on the Farm, by Rev. J. E. Turner 104
Life on the Farm, by Mrs. H. H. Charlton 106
The Coming Farmer, by Rev. G. E. Gordon 110
The Needs of Our Public Schools, by H. C. Thom 114
Domestic Economy, by Mrs. J. A. Clark 117
The Farmer as a Citizen, by Gov. W. D. Hoard 123
One Way to Increase Farm Profits, by Prof. E. S. Goff 131
Working Country Roads, by Robert Fargo 135
Tile-Drainage on the Farm, by C. P. Goodrich 137
Grape Growing as a Profession, by Wm. Fox 140
Butter Making on the Farm, by Mrs. A. H. Darrow 142
How to Make an Incubator, by F. E. Parsons 144
Look After the Boy, by Mrs. Carrie S. Hobart 146
Shall I Build a Silo? by L. H. Adams 149
How I Became a Dairy Farmer, by C. P. Goodrich 159
Successful Corn Culture, by O. Strahl 165
Importance of Sheep on the Farm, by S. A. Pelton 168
Chickens From Shell to Griddle, by W. H. Rose 169
The Business Farmer, by J. H. Hale 172
How to Feed a Farmer, by J. Rhodes 177
Clover for Fertility and Feed, by Chas. V. Guy 179
Money in Small Fruits, by J. H. Hale 181
Breeding and Feeding Shorthorns, by P. Wakem 187

INDEX TO ADVERTISERS.

	Page.
Arnold, A. A., Shorthorns and Berkshire Pigs	258
Ames, A. R., Seedsman	226
Advance Thresher Co., Threshing Machines	223
Adams, H. C., Jersey Cattle	238
Appleton, The, Manufacturing Co., Horse Power and Grinding Mills	245
Belle City Manufacturing Co., Ensilage Cutters and Hay Tools	282, 283
Briggs, H. A., Percheron Horses	236
Barnes, A D., Nursery Stock	278
Boss Harrow Manufacturing Co., Harrows and Pulverizers	250
Butters & Peters Salt and Lumber Co.	233
Bowles, Hadden & Co., Percheron and French Coach Horses	285
Breeders' Directory	197–202
Chicago, Milwaukee & St. Paul Railway Co.	210, 211, 212
Chicago & Northwestern Railway Co.	228, 229, 230
Chicago, St. Paul, Minneapolis & Omaha Railway Co	237
Chicago, Burlington & Northern R. R. Co	286
Cornish, Curtis & Green, Ensilage Corn and Dairy Supplies	219
Clapp, I. J., Guernsey Cattle	270
Currie Bros., Seedsmen and Florists	279
Convey, Thomas, Poland China Hogs and Fowls	280
Chapman, T. A. & Co., Dry Goods	288
Dunham, M. W., Percheron and French Coach Horses	cover
Dickinson, The Albert Co., Seedsmen	253
Eagle, H. A., General Supply Store	255
Fox, A. O., French Coach and Standard Bred Trotting Horses, Shropshire Down Sheep	203, 204, 205, 206, 207
Fox, William, Jersey Cattle and Grape Vines	272
Fuller & Johnson Manuf'g Co., Agricultural Machinery	242, 243, 244
Fairbanks, N. K., Guernsey Cattle	267
Fairbanks, Morse & Co., Eclipse Wind Mill, Stock Tank and Heater	261
Famous Manufacturing Co., Champion Baling Press	248
Fagg, Peter, Standard Publications	235
Green Bay, Winona & St. Paul R. R. Co	264
Gordon, G. E., Guernsey Cattle	265
Galbraith Bros., Clydesdale, English Shire and Suffolk Punch Horses	284
Graham & Pollock, Clydesdale and English Shire Horses	277
Genesee Salt Co	249
Hacker, T. L., Jersey Cattle	220
Hoover & Prout, Potato Digger	215
Hamilton, C. H., Blackberry, Raspberry and Current Plants	275
Heyn, H , Dry Goods	256
Hamilton, W. L., Guernsey Cattle	214
Jacobs, W. H., Shorthorn Cattle and Berkshire Pigs	218
Johnson & Field, Fanning Mills and Rollers	225
Kelly, T. L. & Co., Dry Goods	221
Keystone Manuf'g Co., Agricultural Machinery	216, 217
Leslie & Burwell, Polled Angus Cattle	262
Louis, Theodore, Poland China Hogs	287
Morgan, James	cover
Milwaukee & Northern R. R. Co	240
Milwaukee, Lake Shore & Western R'y Co	260
Miller, C. B. & Co., Jersey Cattle	263
McKerrow, Geo., Shropshire and Oxford Down Sheep	281
Northern Pacific R. R. Co	268, 269
Orr, A. J., Creamery	227
Ogilvie, R. B., Clydesdale Horses	274
Pabst, Fred, Percheron Horses	271
Rosenkrans & Thatcher Co., Watches and Jewelry	209
Rich, A. W. & Co., Dry Goods	241
Ross, E. W. & Co., Ensilage Cutters	222
Roe, D. H. & Co., Dairy Supplies	254
Reid Bros., English Shire, Clydesdale and Cleveland Bay Horses	276
Sanger, C. M. & Son, Shorthorn Cattle	273
Salzer, John A., Seedsman	231
Stafford, W. K. & Co., Crockery	213
Stowell, V. G., Tank Heater and Wind Mills	251
Smalley Manuf'g Co., Ensilage Cutters	246, 247
Sheldon, The S. L. Co., Agricultural Machinery	232
Schroeder, Gustav, Victoria Swine	236
Swab, J. F., Cream Separators	252
Uihlein Bros., Standard Bred Trotting Horses	266
U. S. Wind Engine and Pump Co	224
Urquhart, John, Holstein aud Jersey Cattle	239
Valerius, Dr. & Co., Clydesdale, English Shire and Percheron Horses	257
Wisconsin Central R'y Co	234
Western Farmer Co	208, 227
Wylie, Geo., Shorthorn Cattle and Poland China Hogs	259
Warder, Bushnell & Co., Champion Mowers and Binders	cover

PREFACE.

The farmer is the object of a great deal of solicitude in this day and age. A great many men have a message for him. He is made the subject of a great deal of gratuitous advice. If he fails to benefit by this advice or grow quickly to the full measure of his stature as a producer of food, and a citizen, it certainly will not be for a lack of self-sacrifice on the part of society in his behalf.

The foregoing is not written in a spirit of sarcasm, although much that is said and done for the farmer needs to be satirized, for the farmer himself is being farmed by interested parties. The fact remains, however, that there never was a day of greater activity among the forces of society for the enlightenment of the farmer than the present day.

The very first difficulty that is confronted is the greatest of all. It is the question, "How shall the farmer be reached?" We do not mean the intelligent, progressive farmer. He reaches himself and does not depend on others to think for him. He constantly seeks food for better thought and judgment by virtue of his own force. He is constantly in the knowledge market ready to buy what he wants.

It is the average farmer that society is after just now. Of necessity he stays at home most of the time. Of necessity he works hard early and late. He thinks he has no time to look about and see if there is not a better and more profitable way of doing his daily work. The work is there right on top of him every day, and so he does the best he can and toils along in the same old way, working hard and getting little pay for his labor. It is the general conviction of these facts that has caused such a quickening in society in his behalf.

Now this average farmer must be reached in some way. How shall it be done? He is the mountain. He cannot go to Mahomet. How shall Mahomet get to him?

The great object is to reach him and create in him a hunger for more and better knowledge. Two great facts confront this average farmer and silently, like the forces of light and heat, they have been making his kind of farming more and more difficult.

First, under the natural law of competition, his products have been gradually growing cheaper while he has taken but little pains to keep pace with this decrease in price by studying how to reduce the cost of production. With him it is less and less money each succeeding year, and still the same expense for production.

Right here step in a lot of advisers who tell him that the cause of all this lies in railroad extortions, or the tariff, or trusts, or monopolies. Scarcely one will tell him that the reason of the fact lies in himself. It is so easy for the unsuccessful man to cast the blame upon everything except himself. He has not kept place with the world; he has been jogging along in old ways and methods until old ways and methods will no longer produce a pound of grain, or butter, or cheese or meat or wool, cheap enough to meet the price and leave any profit. This average farmer is a manufacturer of food, and he must wake up and use a manufacturer's brains, and close economies in production, or he will be worse pinched in the future. There is no hope for old methods. The world is bound to have cheap food, and the world is right. The success of the brainy, progressive farmer in producing it and that, too, at a profit, shows it can be done.

The second great fact that is troubling this average farmer is the loss of fertility in the land he tills. Here is the upper and nether mill-stone between which he is being ground: *Less price and less productive power in his land.*

No wonder he squirms. No wonder he looks eagerly from Doctor Anti-monopoly to Doctor Anti-trust or Doctor Free Trade, and asks: "Have you no remedy for my deep distress?" Plain old Doctor Common-sense tells him he must stop this ruinous way of doing things; that he alone is to blame for the situation and not outsiders. He tells him that the land is poor because he has made it so, and not the railroads or the tariff. He tells him that it takes more brains to make a profit at any kind of farming than it did in times of high prices and more productive soil, and that he must adapt himself to the changed order of things. *All* this he tells him, or would tell him if he could only get his ear and attention. Therefore, how shall this farmer be reached? is the important question of the hour.

We believe that the most practical and successful method of reaching him is through Farmers' Institutes, and meetings of like character. The two hundred and forty two days' meetings held by the Wisconsin Farmers' Institutes, have done more to reach the great mass of unreached farmers in this State, in the past four years, than all other agencies of society combined. These meetings have implanted a hunger for better intelligence in thousands, where it but feebly existed before. A wonderful amount of daylight has been let into dark places. The conceit of ignorance has been driven out and the dry rot of stupid indifference banished to an extent that is wonderfully encouraging. The agricultural journal, the agricultural book, the agricultural college and the experiment station are for the men who read, study and think. Let the Farmers' Institutes have their perfect work first and these will follow. In this way shall the average farmer be reached.

LETTER OF TRANSMITTAL.

HON. GEO. H. PAUL,
President of Board of Regents, University of Wisconsin:

I have the honor of presenting to you Bulletin No. 3, Wisconsin Farmers' Institutes. An edition of 31,000 copies has been issued and will be distributed to the farmers of the State free.

Early in September I addressed a circular letter to many of the leading men of Wisconsin, and to a few of the most prominent agricultural thinkers who have assisted at some of our institutes, the following questions:

Have the Farmers' Institutes been of any benefit to the farmers of your county? Have they aroused a spirit of inquiry for better work, and for more systematic effort? Has your observation led you to note that the most intelligent and successful farmers attend and take part in these Institutes, and invariably have faith in their business? Do you think they have a tendency to advertise and popularize our State University? Have they given our State a prominence abroad?

I append the following letters.

W. H. MORRISON,
Superintendent.

Madison, Wis., Nov. 1, 1889.

MR. W. H. MORRISON — "Judging from the list of your institutes for 1889–90, there seems to be no abatement of effort on the part of those who have made the Wisconsin Farmers' Institutes not only the pride of the State, but factors of active power for the betterment of the condition of the farmers throughout the whole continent. I came back from the Wisconsin Institutes to Canada with a new inspiration for endeavor on behalf of our farmers here, and also with an increased store of information for their benefit.

"The published annual report of your Institute work is the best compendium of crisp, living thought on practical agriculture that has come into my hands, and through the medium of the agricultural press, its contents are touching the reading farmers in all English speaking countries. Largely through the agency and aid of Farmers' Institutes, agriculture is beginning more fully to offer scope for the exercise of the powers of the most ambitious and talented young men in all highly civilized lands. You are engaged in a truly good and ennobling work. I wish you God speed."

JAS. W. ROBERTSON.

Ontario Agricultural College, Guelph, Ont., September 23.

MR. W. H. MORRISON — "To all the above questions I unhestatingly and most emphatically answer, yes.

"The design of the Institutes was to awaken an interest in farming, and to impart practical knowledge in its various branches. And in both of these directions the success has been greater than their most sanguine supporters dared to hope. It was supposed that after they had ceased to be a novelty the interest in them would decline, but from personal observation I think the attendance during the last winter was uniformly larger, and the interest better sustained through the entire session than when first started.

"As to the State University, only a few years ago a feeling of antagonism was almost universal among the farmers; but the attendance of Professors Henry and Babcock, and their teachings, together with the work of the Experiment Station, has produced a marked change; and to-day the State University of Wisconsin may reckon among its staunchest friends the better class of farmers through the entire State.

"The almost universal sentiment is, I believe, that in no other way could so small an amount of money have been used with such good results as that expended in Farmers' Institute work; and all are looking forward to the meetings of the coming winter with increased interest."

CHARLES R. BEACH.

Whitewater, Wis., Oct. 4.

MR. W. H. MORRISON — "While it is true that I did not have the opportunity of visiting your State the past year of Institute work on account of other engagements, I have remembered with pleasure my brief experience during the course of the work for 1887–88. I have thought it over and over again with increasing favor. The work is so practical and, withal, covers so much ground, that I do not wonder at all that halls were crowded, in many places almost to suffocation. If the farmers of your State fully understood the character of the work being done in the holding of your Institutes, they would have to be multiplied a hundred-fold to accommodate the attendance. No farmer, fruit grower or the breeder of any kind of live stock, can afford to neglect attending your Institutes. They have an uplifting influence that will be developed more and more as the work progresses. They are in fact so many schools in which the experience of the life time, almost, of practical men is handed out without money and without price, to aid those in attendance in achieving better success in life.

"I sincerely wish that your work for the season, just beginning, may be marked for the increasing interest attending it, and I shall expect to hear from time to time a good report from the leading State in the Farmers' Institute work."

J. J. W. BILLINGSLEY.

Indianapolis, Ind., Sept. 19.

MR. W. H. MORRISON —"I have often had occasion to tell the story of that farmer, out in Buffalo County I think it was, in your State, who came to the Institute on horse-back and became so much interested that he walked home, two miles, and never once thought of his horse until he missed him from his stable, when doing his chores. If the Institute did not help that man, I am no judge. If there were not thousands of others stirred up and helped, I am greatly mistaken.

"I consider your Institutes models, as conducted, and would that every State could be roused up to do as well."

T. B. TERRY.

Hudson, O., Sept. 16.

MR. W. H. MORRISON — "I have, as you know, followed the Farmers' Institute work with special interest and attention, not only in Wisconsin, but in several other States. To say that I regard the work of this particular feature of our intellectual progress as the most important now going on in our midst, and that nowhere is it more energetically and more practically carried on than in Wisconsin, is simply to re-iterate what I have often said before in the agricultural journals with which I have been connected. Lest the first statement, so briefly and strongly put, should seem to some who have not given the subject the attention it deserves, to be exaggerated, I would add an expression of my conviction that without the Institute work, the Agricultural Colleges and Experiment Stations would never reach the people they are designed to serve; the intellectual development of the farmer and the practical application of science to agriculture would thus be arrested. Now, in considering this fact, let it be borne in mind, that the farmer class represent nearly one-half the active workers in our great American hive, and, probably, in view of their larger families, more than one-half the population, and that the prosperity of all other industries is contingent on theirs, and I think my estimate of the importance of Institute work will no longer appear exaggerated.

"It gives me great pleasure to congratulate you upon the gratifying progress going on steadily from year to year in the work under your charge — work which must greatly inure to the greatness and prosperity of your beautiful State."

GEO. WM. HILL.

U. S. Department of Agriculture, Washington, D. C., Sept. 16.

MR. W. H. MORRISON — "We are pleased to receive notice that the farmers of Juneau County are to be favored with one of your valued Institutes, the coming winter.

"It is indeed astonishing to note the change in methods and system among our farmers, during the past three years. Since these Institutes have come among us, people who worked in the pinery winters, and regarded their farms as a place to while away their time summers, until the snows again fell, have suddenly realized that the farm can be made a comfort and a home, and that, by proper attention and management, it could be made to pay handsome returns. They have suddenly acquired an interest and liking for the business, and are pushing into improved stock, dairying, small fruits, bees, etc. The result is that their farms are working right up in fertility, and are yielding crops of all kinds, which a few short years ago were not dreamed of. The farmers themselves are getting out of debt, and are on the road to independence and affluence. We credit the Institutes with sowing the seed and pointing out the way to this result. As you must remember the universal attendance of our people at the Institutes each year, and the interest with which they grasp each idea and suggestion advanced, you will not be surprised when I tell you that they did not stop there content with the Institute work alone, but organized farmers' clubs and held regular meetings, and kept right on reaching after knowledge and comparing notes and ideas, with the result as stated.

"It is indeed the best work the State University ever did, and the best paying investment the State ever made, so far as this community is concerned, and we notice with pride the exalted position the State is taking as an agricultural people abroad, since this work has been in progress. Long live the Farmers' Institutes."

W. H. H. CASH.

New Lisbon, Wis., September 20.

MR. W. H. MORRISON — "As far as I can judge, the Farmers' Institutes have been of great benefit to the farmers in this vicinity. We had a good attendance at the one held here two years ago, and all the best farmers in the immediate neighborhood were there. I also noticed thereafter, in our Grange, a continuance of discussion of ideas advanced there.

"This State has an undoubted lead in Institute work, and Mr. Charles Dudley Warner's article in Harper's Magazine, has given the subject notoriety throughout the whole country.

"I have received letters from my old home in New Hampshire, asking about them, and I reply that it is the best thing we have; that it increases our knowledge, our crops, and the the general intelligence and welfare of our people, and elevates the whole tone of thought of the farmers who attend."

MRS. J. A. CLARK.

Waterloo, Wis., Sept. 23.

MR. W. H. MORRISON — "I have no hesitation in saying that, in my judgment, Farmers' Institutes as conducted by you in Wisconsin, are of more moment and fraught with more benefit to the farmers than any other educational system that could possibly be adopted. These Institutes have already been the means of advancing Wisconsin to the front of all her sister States in progressive agriculture. It is fortunate that you have such men as ex-Governor Rusk and Governor Hoard to lend helping hands in the noble work."

JOHN H. STEVENS.

Minneapolis, Minn., Sept. 16.

MR. W. H. MORRISON — "I desire to bear testimony to the remarkable success that has attended the Farmers' Institutes held in this vicinity.

"The plan of calling forth the experience and wisdom of the farmers in each locality has added greatly to the profit and interest of these meetings, and so great has been the enthusiasm that the size of the gatherings has been limited only by the capacity of the audience rooms.

"The best feature of the Institutes is their power to produce practical results, and I believe that the first series of Institutes led to more improvements in dairy methods, to the purchase of more blooded stock, to the building of more silos, and, in short, accomplished more good than could have been achieved by any other agency.

"The farmers have responded with an enthusiasm and ability for which I had not given them credit. It reminds me of the days of the civil war when the common people rose so grandly to meet the needs of the nation. If we continue to build on this broad and solid foundation of facts and experience, and make the Farmers' Institute a part of our national life, we shall elevate American farming to its rightful place, as the highest and noblest of all the sciences."

F. B. NORTON.

Burlington, Wis., Oct. 2.

MR. W. H. MORRISON — "I deem it a privilege to be able to add my testimony to the expressed opinions of others, regarding the value of the Farmers' Institutes as a bettering influence throughout this State. My experience in Institute work in this county has been inconsiderable, but in the counties of Trempealeau, and

La Crosse, for the past four years, I have taken an active interest in the work, and it has been demonstrated to me beyond the possibility of a doubt that the Farmers' Institutes conducted by yourself in this State, have exerted a wonderful power for good. The knowledge they have diffused has been a revelation to even the best and wisest farmers of the State. They have given to farmers a new interest and life in their work, and have done much to encourage and exalt the business of agriculture, conserve fertility, improve our live stock, produce and increase better farm products, infuse system and business principles into farming, and at the same time develop a citizenship of thought and intelligence, of ownership of land and home, than all the other forces and influences combined, which have had in any way to do with our agricultural prosperity. In short the Farmers' Institutes have caused two blades of grass to grow where but one grew before; they have vastly increased the productive qualities of every cow and every acre of land in the State; they have enlightened and made contented the farmers in my opinion, and brought dignity and profit to the profession.

"Five years ago there was not a successful creamery or cheese factory in Trempealeau County. To-day there are seven successful factories of this kind, and the dairy production of the county has been more than doubled. I believe the channels of usefulness for the Farmer's Institutes in this State are numerous and important, and that they should be encouraged and fostered, to the end that their usefulness and value may be increased."

F. F. MORGAN.

Cumberland, Wis., Sept. 26.

Mr. W. H. MORRISON — "For two years we have watched the work of the Institutes as carried on in your State; first by a study of the papers presented at them and the discussions that followed, as they appeared in agricultural journals, then by mingling with your farmers at agricultural, horticultural and stock meetings, and lastly by attendance at an Institute. By the first we were impressed with the vast amount of valuable information brought out. By the second we noticed the broad views and high aspirations of your agriculturists, obtained through the Institutes. By the third we were more than ever thoroughly convinced that there is nothing that tells upon men so much as personal experience. The man who can say, "I have done it," is the man whose words tell. What the farmer of to-day wants is experience, not theory, and that is what the Wisconsin Institutes, more than those of any other State, give its farmers. It is my earnest wish that the coming winter may add new success to that already attained by the Institutes of Wisconsin — the pioneer in this grand work."

W. B. LLOYD,
Associate Editor Farm, Field and Stockman.

Chicago, Ill., Sept. 17.

LAW PROVIDING FOR AGRICULTURAL INSTITUTES.

The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:

SECTION 1. Section 1, chapter 9, laws of 1885, is hereby amended, by omitting from said section the words, "in the months of November, December, January, February, March and April in each year," where they occur in the fifth, sixth and seventh lines thereof, so that said section, when so amended, shall read as follows: Section 1. The Board of Regents, of the State University, is hereby authorized to hold institutes for the instruction of citizens of this State in the various branches of agriculture. Such institutes shall be held at such times, and at such places as said board may direct. The said board shall make such rules and regulations as it may deem proper for organizing and conducting such institutes, and may employ an agent or agents to perform such work in connection therewith, as they deem best. The course of instruction at such institutes, shall be so arranged as to present to those in attendance, the results of the most recent investigations in theoretical and practical agriculture.

SECTION 2. Section 2, chapter 9, laws of 1885, is hereby amended, by striking out the words, "five thousand dollars," where they occur in the fourth line of said section, and inserting in lieu thereof the words, "twelve thousand dollars," so that said section, when so amended, shall read as follows: Section 2. For the purposes mentioned in the preceding section, the said board may use such sum as it may deem proper, not exceeding the sum of twelve thousand dollars in any one year, from the general fund, and such amount is hereby annually appropriated for that purpose.

SECTION 3. This act shall take effect and be in force, from and after its passage and publication.

Approved March 16, 1887.

SHORT COURSE IN AGRICULTURE.

The University of Wisconsin has provided a special course in Agriculture, to accommodate those young men who desire to gain a better knowledge of the science underlying successful agriculture but who can give only a limited time to such preparation. For the accommodation of such students the term opens January 6, 1890, and lasts twelve weeks.

The facilities now provided to make this an intensely practical and profitable course for young farmers are greatly superior to those offered in previous years. A reading room and library have been provided in which students will find the standard works on agriculture and files of seventy of the leading agricultural periodicals, nine of which are from Europe. The lecture room is provided with an electric light so that lantern slides illustrating the lectures may be used.

The famous *Auzoux* life size model of the horse, which can be dissected to show the separate muscles, nerves, blood vessels and bones, will be used to illustrate the lectures on anatomy.

A new feature, added this year, and one of great practical importance is

A COURSE IN PRACTICAL DAIRYING,

under the supervision of Dr. Babcock and Mr. E. M. O'Connell. This will consist of practical work in the new dairy house, combined with lectures and laboratory work.

Mr. O'Connell has studied with Prof. Robertson, of Canada, and during the past season has been giving instruction in dairying to the cheese makers of Sheboygan County, under the auspices of the State Dairymen's Association; Hiram Smith regards him one of the best practical cheese makers in the State.

Through an increase in the corps of instructors and more ample accommodations than heretofore, it has been found possible to so expand the course as to offer the student work ample for two terms, from which he may elect such subjects as, in his judgment, may seem best for the time, and still have fresh work to which he may return another year should he so desire.

The course embraces the following:

Sixty lectures, mainly devoted to the feeding and breeding of live stock, by Prof. W. A. Henry.

Sixty lectures on the elements of agriculural chemistry, by Dr. S. M. Babcock.

Sixty lectures on horticulture and economic entomology, with laboratory work, by Prof. E. S. Goff, embracing propagation, planting, cultivation, pruning, marketing, harvesting and preserving fruits; the growing of vegetables; the formation and care of hot beds; the culture of flowers; the principles of landscape gardening; how to grow, cure and preserve seeds; the principles of selection and the art of cross-fertilization; also the classification of insects, the principal injurious and beneficial insects, with means of preventing insect ravages.

Forty lectures on the leading principles underlying the cultivation of soil drainage, farm machinery, fences, etc., accompanied by laboratory exercises; together with twenty lectures on the physical features of the climate, and meteorology of Wisconsin and the United States, by Prof. F. H. King.

A course in shop-practice involving the use of wood-working tools and the forging of iron, by Supt. C. I. King.

Thirty-six lectures on the anatomy of domestic animals, by Dr. V. T. Atkinson, State Veterinarian.

The expenses of the term need not exceed $70.00 for fees, books, board, room and washing.

This course opens January 6, 1890, and lasts twelve weeks.

No examinations will be required, but applicants must be not less than sixteen years of age and have a common school education.

For further particulars, address PROF. F. H. KING,
Madison, Wis.

UNIVERSITY OF WISCONSIN.

BOARD OF REGENTS.

STATE SUPERINTENDENT OF PUBLIC INSTRUCTION, *Ex-Officio.*
PRESIDENT OF THE UNIVERSITY, *Ex-Officio.*

		TERM EXPIRES.
State-at-Large,	Hon. GEO. H. PAUL, Milwaukee,	1891
State-at-Large,	Hon. L. S. HANKS, Madison,	1892
First District,	Hon. J. V. QUARLES, Racine,	1892
Second District,	Hon. JOHN A. RICE, Merton,	1892
Third District,	Hon. GEO. RAYMER, Madison,	1890
Fourth District,	Hon. GEO. KOEPPEN, Milwaukee,	1890
Fifth District,	Hon. HIRAM SMITH, Sheboygan Falls,	1890
Sixth District,	Hon. FRANK CHALLONER, Omro,	1892
Seventh District,	Hon. JOHN M. TRUE, Baraboo,	1892
Eighth District,	Hon. WILLIAM P. BARTLETT, Eau Claire,	1890
Ninth District,	Hon. E. L. BROWNE, Waupaca,	1891

E. F. RILEY, Secretary.

Committee of Board of Regents in Charge of Farmers' Institutes.

Hon. HIRAM SMITH, Chairman,	Sheboygan Falls.
Hon. JOHN M. TRUE,	Baraboo.
Hon. JOHN A. RICE,	Merton.

W. H. MORRISON, Madison.
Superintendent of Agricultural Institutes.

OFFICERS OF THE STATION.

T. C. CHAMBERLIN,	President.
W. A. HENRY,	Director.
S. M. BABCOCK,	Chief Chemist.
F. H. KING,	Physicist,
E. S. GOFF,	Horticulturist.
F. W. WOLL,	Assistant Chemist.
LESLIE H. ADAMS,	Farm Superintendent.
S. R. BUCEY,	Clerk and Stenographer.

Wisconsin Farmers' Institutes—1889-'90.

Town or Cities.	*Counties.*	*Dates.*
Seymour	Outagamie	Nov. 19, 20
Colby	Clark	Nov. 19, 20
Medford	Taylor	Nov. 21, 22
Waupaca	Waupaca	Nov. 21, 22
Osceola Mills	Polk	Nov. 26, 27
Chetek	Barron	Nov. 26, 27
Cumberland	Barron	Nov. 29, 30
Bloomer	Chippewa	Nov. 29, 30
New Richmond	St. Croix	Dec. 2, 3
River Falls	Pierce	Dec. 2, 3
Menomonie	Dunn	Dec. 4, 5
Hammond	St. Croix	Dec. 4, 5
Durand	Pepin	Dec. 6, 7
Wilson	St. Croix	Dec. 6, 7
Shawano	Shawano	Dec. 10, 11
Wausau	Marathon	Dec. 10, 11
Hortonville	Outagamie	Dec. 12, 13
Grand Rapids	Wood	Dec. 12, 13
Ono	Pierce	Dec. 17, 18
La Crosse	La Crosse	Dec. 17, 18
Fountain City	Buffalo	Dec. 19, 20
De Sota	Vernon	Dec. 19, 20
Baraboo	Sauk	Dec. 23, 24
Portage	Columbia	Dec. 23, 24
Lone Rock	Richland	Jan. 2, 3
Stoughton	Dane	Jan. 2, 3
Mondovi	Buffalo	Jan. 7, 8
Whitehall	Trempealeau	Jan. 7, 8
Augusta	Eau Claire	Jan. 9, 10
Neillsville	Clark	Jan. 9, 10
Black River Falls	Jackson	Jan. 14, 15
Viroqua	Vernon	Jan. 14, 15
New Lisbon	Juneau	Jan. 16, 17
Tomah	Monroe	Jan. 16, 17
Montello	Marquette	Jan. 21, 22
Friendship	Adams	Jan. 21, 22
Plainfield	Waushara	Jan. 23, 24
Westfield	Marquette	Jan. 23, 24
Amherst	Portage	Jan. 28, 29
Winneconne	Winnebago	Jan. 28, 29
Fond du Lac	Fond du Lac	Jan. 30, 31
Dartford	Green Lake	Jan. 30, 31
Shullsburg	La Fayette	Feb. 18, 19
Elkhorn	Walworth	Feb. 18, 19
Brodhead	Green	Feb. 20, 21
Union Grove	Racine	Feb. 20, 21
Jefferson	Jefferson	Feb. 25, 26
Kenosha	Kenosha	Feb. 25, 26
Janesville	Rock	Feb. 27, 28
Waukesha	Waukesha	Feb. 27, 28
Green Bay	Brown	Mar. 4, 5
Manitowoc	Manitowoc	Mar. 4, 5
Waldo	Sheboygan	Mar. 6, 7
Brillion	Calumet	Mar. 6, 7
Hartford	Washington	Mar. 11, 12
Randolph	Dodge	Mar. 11, 12
Cedarburg	Ozaukee	Mar. 13, 14
Juneau	Dodge	Mar. 13, 14
Belleville	Dane	Mar. 18, 19
Dodgeville	Iowa	Mar. 18, 19
Waterloo	Jefferson	Mar. 20, 21
Whitewater	Walworth	Mar. 20, 21
Platteville	Grant	Mar. 25, 27

Closing Farmers' Institute—1889

Waukesha, Wis., March 26-28.

SMALL FRUITS ON THE FARM.

By C. H. HAMILTON, Ripon, Wis.

Start a Fruit Garden.—Set apart a good, liberal piece of ground from your farm for a fruit garden, and give it good protection, by putting a fence around it so that there will be no danger of pigs getting in and despoiling your labor. Fruit on the farm is a subject of great importance—one which the average farmer does not pay the attention to he ought, and he will never know how mean a man he has been to his wife and family until he comes to have the supply of fruits which he may have by a very small outlay of expense and labor. From the middle of June to the first of October he may have for his table fresh fruits picked from the vines, and plenty to put up in cans to use until the fruit season comes again.

Preparing the Ground — Planting.—Prepare the ground well, by applying a liberal supply of barn-yard manure. Plow and harrow it thoroughly, until all the lumps are pulverized, for labor bestowed on the land before plowing can be done with greater ease than after. What shall we plant to secure a grand succession of fruits, from early summer until fall? Strawberries, raspberries, red and black, blackberries, currants, gooseberries and grapes.

Strawberries. — For strawberries don't undertake to set all you may read about in the different catalogues. Let the prosperous fruit-growers experiment with the newer and expensive varieties, and you may learn from them which are best for you. Quality of soil has a great deal to do with the success of many varieties. What may do well and thrive on one kind of soil may be entirely worthless in another section where there is different soil. The Wilson, Cresent, Captain Jack, Manchester, and many of the old and tried sorts will give you an ample supply of delicious fruits, if well taken care of.

Plant your strawberries, as well as other fruits, in rows so that they may be cultivated with the help of horse and cultivator. Plant in rows, 3½ to 4 feet between the rows, and the plants 1½ to 2 feet in the rows.

Frequent and thorough cultivation will pay you, and when cold weather comes on, cover them with some coarse marsh hay, or cornstalks. Remove the same early in the spring.

I think the surest way to have a good crop of fruit every year is to set a new bed each spring. Be careful in the selection of your varieties to get staminate kinds to set along with your pistillate varieties. For example, in setting the Cresent, which is a pistillate, set the Wilson. Some are of the opinion that the expression, "Give them Jessie" was well carried out in the poor success they had with this variety. I have yet to hear of satisfactory results on sandy soil, while with me, on my prairie soil, it has proved quite satisfactory, yielding large, fine, luscious berries.

Raspberries.—Plant raspberries in rows, not nearer than 6 feet between rows and 2 feet in the row. Give them good cultivation, and attend to cutting back the new growth so as to make a low stocky bush, with fine, strong branches. The red raspberries are, as a class, great to sprout, and you need to keep them in rows, generally in a continuous row; but be sure to keep a right-of-way between the rows, so you can cultivate.

Blackberries.—Blackberries should also be planted in hills 3 feet apart in the row, and the rows 7 feet apart. Give them good care, the same as all your other fruit; endeavor to keep them in hills. Pinch them back, and don't let the main stalks grow over 2½ to 3 feet in height; support them by wire on each side and stakes every 20 feet; lay them down in the fall, and cover them with earth.

Currants.—Currants can be as easily grown as potatoes. Set them in rows 6 feet apart and 3½ feet in rows; this will apply to the gooseberry also. Both are subject to the attack of the currant worm, which can be as easily exterminated as our potatoe bugs, by using Paris green in a weak solution, applied at their first appearance, which is generally about as the fruit first begins to form. After that white hellebore can be used with less danger. By watching for their appearance on the bushes and applying either of the above, you will exterminate them with very little labor.

Grapes.—Grapes are as easily cultivated, and about as sure a crop as most of the other fruits. They need good care in cultivating, and pruning or pinching back during their fruiting season. Check strong growth of wood, and see to it that the vines are not overloaded with fruit—more than the vine can probably carry through and ripen. In the fall a vigorous use of the knife is necessary for the good of the vine, in cutting away the most of the new growth, to within a few buds of the old cane, and in removing the old cane as fast as we can procure a young shoot from the crown or base of the plant.

I think the old idea of digging a large hole and filling up with old bones and even dead animals is a thing of the past. My theory is that land good enough to raise a crop of corn is good enough to plant your vines on. Plant them 8 feet apart; train them to a stake or wire trellis; lay them down on the ground and give them some covering—I think to cover with earth is the safest. Straw will answer, but I fear the mice will sooner or later rob me of one season's fruit by gnawing my plants. The varieties of grapes are many, but those for general cultivation are few.

There are many locations in our State well calculated for grape growing yet undeveloped. Plant some grapes. The Concord, a general favorite, Worden, Moore's Early, Lady, Delaware, Brighton, are hard to duplicate.

Fruit as Food.—The importance of fruit as an article of diet is at last beginning to be appreciated. The taste for fresh fruit is growing fast, and while many of our farmers know that they ought to supply it to their families, they still fight shy of planting and say they can buy what berries they want cheaper than they can grow them. Yet they do not. Farmers do not deceive yourselves. Why deny yourselves and families these delicious articles of food? Let us decide to plant them.

Discussion.

MR. FLEMING.—How deep would you plant currants and gooseberry bushes?

MR. HAMILTON.—I should prefer to plant them not over six or eight inches deep. I would not advise the raspberry over an inch and a half under the soil. In planting any plant that has been removed, especially of the vine or tree sort, I generally calculate to plant about two inches deeper than they were before; so as to allow for the settling of the earth around them.

MR. PEFFER.—What varieties of gooseberries do you recommend?

MR. HAMILTON.—The Downing with me has proved the best success, been free from mildew, and yielded a fine crop of berries. The Industry has always done amazingly well for a variety that has not originated in this country, but I find the summer's sun too hot for it, and I also find, by correspondence, that in the old country they are raised most successfully in the shade. I put a cover over my Industry gooseberries, and then I get the strong effects of the sun away from them. I put mosquito netting over them, just enough to break the rays of the sun.

QUESTION.—Have you had any experience with tree gooseberries that are talked about by agents?

MR. HAMILTON.—I never happened to strike one that was very much of a tree. I can manufacture a gooseberry bush that will answer the purpose for a year or two, but I would not guarantee it to remain in the tree shape very long.

MR. DYER.—I am very much troubled with the borer, and have not been able to raise any currants for several years.

MR. HAMILTON.—I have never had any serious trouble with them. I have never done anything more to guard against them than to give my plants good cultivation, and where I have had them attacked they have out-grown the effects of them.

MR. KELLOGG.—If the currant borer once enters the bush, it is very hard to get at. I think the knife and fire and poison are our only remedies.

SUP'T. MORRISON.—How much bush would you have left after all that?

MR. KELLOGG.—I would cut out the older wood and burn it, and leave the two-year-old. I might have to lose my crop of currants, and could afford to. I would poison them every two weeks, the first season. Of course the more you cultivate, the better crop you will have. The best two reds I know are the Fay and the Victoria, which are far better that the cherry.

MR. HAMILTON.—I think the borer will come to solid ground more than if the bushes are well cultivated.

MR. FAVILLE.—Can you tell us what kinds of fruit will thrive, with the attention that the ordinary farmer can give them?

MR. HAMILTON.—There is no use trying to get a good liberal supply of fruit without giving it care. The nearest that will come to it is my friend Kellogg's Crescent strawberry; that will fight for itself better than any strawberry that I know.

MR. FAVILLE.—Isn't it a fact that the average farmer can buy his fruit cheaper than he can raise it? I know you will all say he won't buy it, and very likely he will not, but isn't it a fact that he can devote his attention to his farm crops, and buy his fruit of a professional grower to better advantage, and cheaper?

MR. KELLOGG.—I have my doubts, that is if you take into consideration the enjoyment of going out and picking his own fruit. They say they haven't any time, but I notice that where a farmer goes into his own garden and finds lucious fruit hanging there in bunches, he will pick and eat a good deal. I believe that where the average farmer will buy one case of fruit for his family, if he has the same fruit in his garden, they will eat six or eight times as much.

MR. LOUIS.—I think that Mr. Faville has rather overdrawn the picture. I think if you will give your boy a good cultivator, and have your fruit in rows, and fix it so that he can spare half an hour when he comes out of the cornfield to work in the garden, we could have lots of fruit. My experience is this: If we have to buy fruit we will never have it. With us we can always get it.

SUP'T. MORRISON.— I would like to have some questions drawn out about blackberries. Mr. Hamilton has shipped them across the State and into Minnesota and made money out of them.

MR. MCCLURE.—What kind of blackberries would you recommend for the average farmer so that he can have hardy varieties?

MR. HAMILTON.—I have yet to find the plant that I consider perfectly hardy in all parts of the State. Stone's Hardy will stand some of our winters, but not more than one-half of them; neither will Snyder nor Briton. I do not consider it safe to try to go through the winter with any of them, without laying down. This last winter we have been all right, but you can never tell. It costs very little to lay down the few plants which a farmer has. I am sure $10 would cover the expense, and then you are sure that you are safe and have secured your crop. I consider the Ancient Briton, either for the farm or shipping purposes, the king of them all. The Snyder may be a little bit hardier. It has a little harder wood, something like the Duchess of Oldenburgh, and is a little harder to lay down and protect than the Briton.

SUP'T. MORRISON.—How many acres have you in blackberries?

MR. HAMILTON.—I have but eight acres at present. I think in the vicinity of Ripon there are not far from one hundred and twenty-five acres in cultivation, and I know no reason why they are doing better than in other localities where they get the same care.

MR. PEFFER.—We have had great trouble in our section, the last two seasons. Our fruit has burned up before it was ripe.

SUP'T. MORRISON.—Mr. Gale, do you raise any blackberries?

MR. GALE.—We raise some. We lay down and protect them the same as Mr. Hamilton. We find no variety that will stand without protection. The two last years we found the same trouble the gentleman last spoke of—they have been scalded in the vine, with the best cultivation.

MR. HAMILTON.—A year ago last summer the drouth with us was very severe. It was extremely hot, and the crop in general was a good deal of a failure. I used the "poor man's irrigator" (what they call the horse and cultivator in California), and used it thoroughly and steadily every day. My neighbors came to consult me about the crops drying up, and asked me why my crops looked better than theirs. I kept the cultivator going and carried my crops through, while some of my neighbors stood around on the corners of the street, in town, and told how dry it was, and how we were not going to have any corn or berries. Some of them stayed at home and stirred their ground and cultivated it, and they came out the best. While my neighbors had hundreds of bushels dry upon their vines, with my steady use of the poor man's irrigator, I carried the crop of hundreds of bushels through. I use mulching as much as I can; still I cannot say that if I mulched my vines I need not cultivate. I cultivate them just the same.

MR. THOM.—How can you cultivate when you mulch?

MR. HAMILTON.—The rows are seven feet apart, and we calculate four or four and a half feet in there to keep stirring. There shall be a mulch of about one foot on each side, and then we have it fine and make a mulch out of the earth itself. You will find after cultivating, that there is a vast amount of moisture collected under this mulch that we have made out of the land, by breaking up the little capillary air cells. I cultivate shallow, a little deeper in the spring, and not over two and a half or three inches.

QUESTION.—Have you ever tried dewberries?

MR. HAMILTON.—I have tried a few hundred plants. The Lucretia did extremely well, and bore a very good crop of fine berries.

MR. DYER.—Tell us you method of operating; whether you leave many stalks in a hill, and how much you cut off the tops of your blackberries.

MR. HAMILTON.—I plant my blackberries seven feet apart between rows, in rows three feet, and I try to keep them in hills. They are supported by wire on either side. When the growth has got to the length of about two and a half feet, I cut the top of the cane off; that stops the upward growth of the plant. The blackberry is inclined to grow a long spindling cane. I cut it back and it forms itself into a tree. In laying them down, if the rows are running north and south, we will commence at the north end. We will remove the earth say four inches from the hill, and three inches under. That gives you room for this crown to set over in, and for the plant to set down in this hill, you turn it over and place your foot firmly at the base. Remember we are bending the root and not the cane. We put earth enough upon them to press the tops together as close as we can; then cover them, so that one lays alongside of the other. I put on just enough earth so that they are out of sight. I uncover them in the spring as soon as the earth gets in good workable order. It is better to uncover them early than late, because they will start under the earth sooner than they will if they are taken up. I shall not uncover mine until the middle of April, unless the season turns out much different than we anticipate. The thornless blackberry is something I have never seen, though some have less thorns than others.

THE FARMER'S FRUIT GARDEN.

By GEO. J. KELLOGG, Janesville, Wis.

Why have our apple trees died so badly all through the State in the last five years? The poor shape of the top is one cause. There is not one tree in a thousand that is put in the ground in good shape. The tree should have a central trunk, with side branches from six to eight inches apart. You don't want any crotch in the top. Just as soon as the tree forms a crotch, it is in bad shape to stand the effects of frost and ice and wind. It becomes cracked in the crotches and liable to break down. Do not have limbs nearer than three or four feet from the ground for *certain kinds*, and other kinds five feet. If your trees are not in good shape, prune them into shape.

The Best Site.—The best site for the orchard is on the clay ridges. There is some stony soil out west of here that is better for apples than anything else, and you won't have to move the stones either to plant a few apple trees; you want to put them on the north side of the hill on the highest ground you have. If you have low black soil, plant but few kinds. There are plenty of varieties that will flourish in this State, if properly pruned at planting and cared for in the trunk. The trunk must be shaded. Mr. Philips, of West Salem, has gotten up a device which is a good thing for that — lath and wire woven together, and it surrounds the tree, protecting the south side from the sun in the winter and summer, and prevents the bark from bursting and the borer from getting in.

Just as soon as the sun scalds the southwest side of the tree, the borer gets in, and that is usually the first season. You should shade that side of the tree, and then the borer won't work and you will get none of this sunscald. It is the heat of February and March that kills the trees on the southwest side, and also the heat in June July and August. If you have nothing better at hand enclose the tree with brown building paper or newspaper, never using black; anything to keep the sun off. A wisp of hay, tied up and down will do, but Mr. Philip's device of lath will also protect trees from mice and rabbits, as well as sun-scalds and the borer.

The first few years I would raise in my orchard a low crop; potatoes are best. There are some places on which you can not grow apples, but in this low black soil you may, by ridging and planting on the back furrow, grow the Tetofski, a few of the Russians, a few of our native seedlings and Duchess and make a comparative success of it.

Plums—Cultivating.—If you don't raise your apples and your plums, you won't have them, as Mr. Hamilton says. The old Eastern varieties are not worth planting unless you jar your trees once or twice a month for two months. If you do that, you will fetch down the little bug that is on them, the Curculio, and if you will have your chickens under the tree you needn't bother to pick them up yourself. I would like to cultivate the orchard for two or three years, then seed it to clover so as not to get too great a growth; and do not cultivate your orchard later than the first of July. If you do, you will get up fall growth and the sap may be caught up and the frost burst the bark of your trees.

Seeding Down—Manuring.—After the orchard gets to bearing, or even before, if it gets to growing too rapidly, you had better seed it down. You do not want more than six inches of growth on the end of the limb, and then it goes into winter quarters in good shape. The only way for a tree that is growing too late is to pinch off the terminal shoots as far as you can reach them. Seed down the orchard about the time it gets to bearing, and after that your orchard is paying you, give it manure and keep up a good growth. The apple tree that bears heavily will make hardly an inch of wood. It should make at least two inches every year; so if your orchard is paying you in bushels, give it manure. There are more orchards starved to death in Wisconsin to-day than the winters have killed. The apple tree that bears for twenty years and never a wagon load of manure gets around it, ought to die. Manure it in winter, or spring, any time you have the manure. Winter is the best time. Give it all the wood ashes you have unless you want them for the strawberry bed.

An Acre for Garden—Grapes.—I would like to throw out a few suggestions about the farmer's garden. I would like to have the farmer devote to it one acre of the best ground, that is fenced off, so the chickens cannot get into his garden. I want you to have this acre a long acre. Don't make it square; make it not less than twenty rods long. I would begin on the west side and go out eight feet from the fence, and put in a row of grapes. I would put the grapes on one side, because they will stand for a long time and pay you; and I want them eight feet from the fence, because I want you to get through there with the cultivator, and if it is twenty rods long you can afford to use the sulky cultivator. There are many kinds of black grapes—the Concord, Moore's Early, the Victor, Worden, Brighton and Delaware for red; the Lady, and the Niagara for white. The first year you want to throw all the growth into the cane, growing it up as high as you can; tie to any kind of support. You don't want an expensive trellis; you don't need a trellis at all until you get your vine bearing at three or four years. In the fall I would cut the cane clear down to two buds; the object is to give strength and growth. Then, I would let two canes grow and throw all the growth into these two canes the second year. Do not fail to prune your grapevine just as soon as the leaves fall in the autumn, any time in October or November or the first of December; then cover it with earth. You always want to lay down the same way. The second season grow two canes as big as you can; the second fall cut one of them off clear down to the ground, leaving two buds only.

Fruit-Buds—Foliage.—[Samples of cane and grape wood shown to the convention.]—There are three fruit-buds, each one capable of producing three bunches of fruit, nine bunches, which is more than you ought to expect of a two-year-old vine. After you have grown your vine until you get an old cane with side branches, prune and leave on but three buds of *new wood;* that is what bears fruit. You want to remember one thing—it is the foliage that ripens the fruit. I have seen persons cut off the foliage to let the sun get at the fruit. If you do that your grapes will stand right there until new leaves are made; they cannot breathe without those lungs. It is shade that makes nice fruit. Of course, if the foliage is mildewed, it will do no good; the fruit won't ripen anyway, but it will do very little harm to leave it.

Pruning.—The full bearing vine is at four years. You aim to have on that vine one hundred buds, thirty three spurs. If you remove the third bunch, you will get almost as much on the two remaining as on the three. Do not let your vines over-bear; that is one reason the Concords did not ripen last year. We had a good many cold nights, too, in the fall. If your vines get so big and clumsy that you cannot lay the old canes down, no matter about them. If you can lay the *top* down and cover this new wood, you are safe. Always keep a new cane at the ground so that if the mice or anything should injure your old bearing cane, you can renew from these new ones.

If your vines have grown out of your reach, fifteen or twenty feet, just saw off the old cane and raise a new one near the ground, if you can afford to do without the fruit; or I would coax them along through the summer, and in the fall I would renew them; but if they are out of shape, have not been pruned, you can do it this spring, after the leaves have been fully formed, you can cut the vines all to pieces and it won't hurt them.

Currants — Gooseberries. — The next row to grapes, I would put in currants and gooseberries, and if you don't want a whole row, finish out with pieplant, but do not make the row less than twenty rods, and I would leave eight feet between rows; then you can take in a wagon-load of manure, or your cultivator, very easily.

Blackberries — Covering. — Next after the currants, I would plant the blackberry, because that is a high bush and you can't drive over it. Snyder is the earliest, then Stone's Hardy and Briton; you can plant all kinds. The Bartel Mammoth dewberry on rich clay soil is doing fairly well, and the Lucretia also. In digging to lay down your bush, I would dig on both sides.

You can cover blackberries very easily. In the spring get them out pretty early; they will stand the cold nights better, and they won't leaf out quite so quickly. I have left them in so long that the buds have become white, and I have lost the fruit.

Red Raspberries.— Next after the currants and blackberries, plant a row of red raspberries; the kind with suckers that come up all over the lot, and treat these suckers just like weeds and they won't bother you. Put in your rows eight feet apart. There's nothing better than the Turner and Cuthbert, and if you want to finish out your row with a kind like the black raspberries, I would plant Shaffer's Collossal. It is not as sweet as the other two, but it is a great bearer, a mongrel red.

Black Raspberries.— In the next row I would plant black raspberries, Tyler Souhegan and Gregg. There are two or three other varieties, the Nemaha and the Ohio.

The Gregg is the largest and latest; the two first are the earliest. I would cut the new growth at three feet so that they throw out latterals; they are easier handled and stand up against the wind better and are easier to cultivate. Now we have the five permanent rows, that will stand there for ten to twenty years, if you take care of them.

Strawberries—Setting Out.—Now we come down to the strawberry ground. You should renew your strawberries every two or three years; plant on potato ground. If you have to plant on sod ground, watch for the grub. He does not follow the potato or corn crop very much. In this first row of strawberries, eight feet from the black raspberries, I would advise you to set one whole row the length of the garden. If you put the plants three feet apart, one hundred plants will go the whole row. I would put in that row about four kinds of pistillate varieties, all in one row. I would not plant nearer than four feet. and one, two or three feet in the row. For the pistillates I would mention the Crescent, the Manchester, the Bubach, a new variety, and the Ontario for the fourth. In the second row, right opposite, because the blossoms of one have to pollenize the other, I would have the Wilson and the Jessie; the Captain Jack and the Miner. These are all good kinds.

Large Crops of Strawberries.—The Jessie has not done quite as well as was expected; on the lighter soil it may not do as well. A prize of twenty-five dollars was offered for the best show of fruit and the most pounds from 12 plants in the United States, and a man in Massachusetts drew the prize; he had one berry nine inches in circumference.

From twelve plants he raised 41¾ pounds. This is sworn to, and there is no question about it. This is at the rate of 1185 bushels to the acre. I am not prepared to tell you the minutia as to how he did it. He not only fertilized that ground to the highest possible point, but he knew just how to do it. Then he put on water enough to make up the rest. With plenty of water and manure you can almost defy the seasons in growing strawberries.

Mr. Smith, at Green Bay, piles up the manure six feet deep and *spreads it around* and goes to work. You want rich ground if you are to get a product of anything. I have known the Wilson to bear, on a square rod of ground, five bushels; that is 800 bushels to the acre. The first plantation I put out of the Cresent, the first season's picking, I put a boy on one row and he took off 100 quarts in nine hours from one hundred plants, but Crescent is worthless alone.

Hoeing—Cultivating—In growing any kinds of strawberries, hoe them the first season every Monday morning just as sure as your wife washes; it will pay you. Keep them cultivated narrow; if you can't hoe them, keep the cultivator going the best you can. In the fall just cover the foliage out of sight. Next season, set two more rows and four different kinds; then you will be sure of having berries right along.

Discussion.

MR. TIFFANY.—How do you bring down the blackberries?

MR. KELLOGG.—Put the fork on top and then put your foot at the base. I can do it alone; it is better to have three. When the plant becomes larger, the cane heavier, dig around a little more and bend it in the root. You don't want to break the cane.

MR. LOUIS.—I find that a six-tined manure fork, stuck right over the top of the bushes and fastened in the ground gives me a good chance to cover them, and I can do it alone pretty easily.

MR. KELLOGG.—Yes, and you can use a board that way.

QUESTION—What kind of manure would you recommend for the garden?

MR. KELLOGG.—The best rotted stable manure for the garden. Cover your strawberries with marsh hay or corn-stalks, or anything that has not clover or timothy seed in it.

CAPTAIN ENOS.—How was the land manured that raised 1185 bushels of strawberries to the acre?

MR. KELLOGG.—Not only was the best stable manure used, but commercial fertilizers were added to an enormous extent. Any of you can grow two hundred plants of well selected varieties and get three to five hundred quarts the following season, with fair treatment. By-the-way, don't have a tree of any kind around a vegetable or fruit garden. There is room enough for all your onions right alongside of the strawberries. Give your grapes the sunny side. If your rows run north and south, put your grapes on the west side so as to get the morning or east sun.

SIGNS OF PROGRESS IN HORTICULTURE.

By B. S. HOXIE, Evansville, Wis.

Knowledge Required.—Horticulture is nothing more than intensive agriculture. If a man says that he is a horticulturist, you must expect that he knows something about the soil, its value and capacity; he must know something about trees, and plants and birds and insects; he ought to be prepared to answer a great many questions that the agriculturist would not know very much about. The diseases of trees and plants seem to be assigned to the horticulturists to be studied out, because they come more into contact with all these things. They are learning more about birds, those that are our foes and those that are our friends; they are learning more about all the species of trees that can be cultivated in our climate, or in any of the States of the United States, that are found in foreign lands; they are experimenting in different directions; they are lovers of nature and workers with nature.

Progress in Thirty Years.—We find, in looking over the history of horticulture, and the work that has been carried on by individuals and experiment stations, that we are now just beginning to find out something of the capacities, something of the blessings, the advantages of fruit and fruit culture. Thirty years ago, where there was one grape-vine growing in the United States, I presume to-day there are a thousand. You older people can remember when the Concord grape came out, and now it is the grape of the million. I think Prof. Henry, at the experiment station, has shown to the farmers of Wisconsin how many tons per acre the people of Wisconsin can raise, and just what it costs them. I think he states that we can raise grapes at about two cents a pound; but there is a larger value attached to fruit-growing than mere dollars and cents, and so there is in cultivating plants and shrubs about our houses, on the roadsides, and about our depot stations, and everywhere where you have something to beautify nature.

Horticulture in the Schools.—We should find the work of the horticulturist more evident on our school grounds; our boys and girls should know something about horticulture. I think if you should go into your school and ask the boys and girls how many varieties of trees you have in your beautiful village, and where they originated, there would not be one in fifty who could tell you; they would not know what the trees were good for, except to be a shade on the roadside, or, perhaps, for firewood. Now, in Austria and in Denmark and France they teach those things in their schools. They have a dozen schools in agriculture and horticulture in Austria where we have one in the United States. The boys and girls are learning all about birds and insects. Some have taken the ground that we should have an agricultural college in every State and a branch school in every county, and that the teachers in the schools should have a general idea of agriculture and horticulture.

Last year an application was made to me by some ladies who were running a school. They had a farm that was willed to them, and they wished to raise on it for their school all kinds of garden products, and wanted to find a man who knew how to take care of a garden and fruits, cultivate them, etc., and they supposed I could find one, and I thought I could. I wrote to J. M. Smith, of Green Bay, and he replied that he had had frequent applications for such men to take charge of gardens, and he did not know one, and the result was I was obliged to write to these ladies that I could not find them a gardener.

Horticulture at the Exp't Station.—This State has felt the need of a professor of horticulture for a number of years. Those who have been long engaged in the work of horticulture, experimenting in raising fruits, etc., have met with a great many disadvantages, more than they ought to, in some cases, and we have felt the necessity of a professor of horticulture, one who would put us on the right track, so that a man might know whether, if he planted, he could expect to reach any results. Prof. Goff, of the New York Experiment Station, has been engaged to come to this State to occupy the chair of horticulture in the University of Wisconsin. Prof. Goff is well known, though he is a young man, and we are hoping for good results, but do not expect too much. Do not expect that every farmer can set out apple trees and raise fruit to perfection, or that we can have every variety of fruit that is grown in New England; but let me tell you that a man who understands the business of experimenting on a right line of work and directing these experiments, if he is the right man, can accomplish far more than we can groping our way blindly.

Fruits for Wisconsin.—While Wisconsin is not so well favored as the middle States or Michigan in the raising of certain kinds of fruit, yet there are fruits that we can raise in Wisconsin with a greater degree of perfection than they can in any other State. J. M. Smith says there is no State in the Union that can raise strawberries equal in flavor and quality to the State of Wisconsin. We have to use judgment in all these things. Because Hiram Smith at Sheboygan succeeds at dairying, or J. M. Smith at Green Bay in raising strawberries, it does not follow that every farmer can be successful as a dairyman or in raising such fruit. Every man must do that which he is best adapted for, or his land is best adapted for.

Our fruit growers have done a good deal of experimenting, and so far generally to their cost, and we have made progress. We have found out that we can raise better strawberries and better raspberries and better balckberries and just as good grapes as can be raised any where in the world, and I feel sure that the farmers of Wisconsin can raise all the apples they need for their own use.

DECORATIVE HORTICULTURE.

By JAS. CURRIE, Milwaukee, Wis.

Objects of the Art.—Decorative horticulture, as we understand it, means the art of gardening in all these branches, namely: The making and care of the lawn, the planting of trees and shrubs for ornament, and the cultivation of all kinds of flowering and ornamental plants, whether native or exotic, hardy or tender, in the open garden, or in the conservatory. The objects of this art are varied. You all know what a transformation it has, within recent years, effected in our cemeteries. The best of these, only a few years ago, were either bare and bleak, or if wooded, no better than the ordinary forest or clearing; in either case rough and uncared for, very desolate and uninviting. Now we find them places we even delight to visit. And then witness the many beautiful public parks, those grand resorts for the people of crowded cities, where they may go to enjoy, to their heart's content, the clear fresh air, rendered none the less pure by the sweet fragrance of lovely flowers, and the balmy foliage of trees and shrubs. In every instance these parks are indebted to the art of decorative horticulture for much of their beauty. All the beautiful private places, now so numerous in this country also bear evidence to this art.

Taste for the Art.—We cannot expect to find, in a country so new as this is, many places of large extent so beautifully laid out as we do in the older countries; but we have abundant evidence that the taste for this art is very rapidly developing everywhere throughout this country. The changed and ever improving appearance of our city and village homes assures us of this. Nearly every occupied lot now has its well-made, well-kept lawn, its handsome trees and shrubs and pretty flowering plants, and sundry other embellishments, rendering it attractive and beautiful. The country home of the city merchant is now less frequently seen situated in a thick forest or in a bare, uncultivated field. He has been obliged, perhaps, to take up his residence in the country for the benefit of his health; or his love of rural scenery has been the incentive. He delights to breathe the pure, bracing air of the country, and never tires of feasting his eyes on the extensive and varied landscape which surrounds his pleasant home. He is a true lover of nature, in all her native and rugged grandeur; but that does not prevent him from employing the landscape gardener's art to improve the immediate surroundings of his home. Some people condemn that art, because they consider it but an imitation of nature, and they cannot endure imitations of any sort, and this one in particular. But the true artist has really no intention of imitating nature's works. He employs her materials to create scenes which are polished and refined, pleasing to the eye and adapted to the circumstances. Under his masterly direction he produces effects, which, it is fair to say, are scarcely less natural, and certainly are more consistent in the vicinity of the home, than any of nature's handiwork. Our country resident, therefore, who thoroughly appreciates the beautiful, as well as the picturesque in nature, and who has a keen sense of refinement, embellishes his home grounds, but is careful not to over-do his work. Good taste is strictly adhered to.

Pleasures and Benefits.—I am grieved to find so many people, possessed, too, of more than ordinary intelligence, who are stone-blind to the pleasures and many real benefits to be derived from decorative horticulture. They look upon it as a most unwarrantable luxury, still a very good way for fools and rich men to put some of their surplus money into circulation. The cultivation of flowers, they say, may be fit for women and children, but full-grown business men have no business with it, and any one who devotes any of his time and talents to it is a crank, with a strong tendency toward softening of the brain. What a delusion! All of you who have lawns and flower gardens, I know, will be prepared to corroborate my assertion, that the pleasures and benefits to be derived from the cultivation of plants, a well-stocked flower garden and nice lawn, with trees, shrubs and flowers pleasingly arranged, are almost innumerable and inestimable. Let me direct attention to one important benefit to be derived from the cultivation of flowers. The necessary labor is light and very interesting. It demands attention, but does not impose a burden on the mental faculties; it may be made really nothing but amusement; and, moreover, is conducted out-of-doors in the clear, fresh air and sunshine. Is it any wonder, then, that it proves so often such a splendid tonic for invalids and weary, care-worn business men? I fancy I hear some of you farmers saying: "That sounds very well, and may be all right in the city, but of what benefit is gardening of that kind to us? We have all the out-door exercise and labor in our fields that any man can want; and where have we time to bother with flowers and fine lawns?" This is nothing new to me. I have listened to many similar arguments many a time; but I am still prepared to defend the art, and most emphatically assert that it is as much at home on the farm as on the city lot, or in the public park, and its pleasures and benefits may be participated in and enjoyed as much by the farmer as by the townsman. I take my stand with the greater confidence, because I am assured of the support of every farmer's wife and daughter, and of all those farmers whose handsome homes we find here and there throughout the country, a delight to their owners and even the pride of their neighbors.

Make Your Homes Attractive.—Farmers, I admonish you to make your homes attractive, to satisfy your wives and your children! We hear a great deal about providing children with amusements at home, that they may have less desire to go elsewhere to seek them. Then, why not give them a nice garden, and encourage them to spend some of their leisure hours in it, and buy them a few plants and seeds, and let them cultivate their own flowers? Very few children are averse to this kind of work; it is amusement to them, and, as you are aware, most healthy recreation. Many a very delicate boy and girl, even on the farm, have, by the light work in the garden, which kept them employed in the open air, been nursed up into strong and healthy men and women. The city has great allurements for the farm boy. I am by no means opposed to his coming to town, for we need our Lincolns, Garfields and

Rusks to man the ship of state, and we look to the farm for them; but we cannot afford to deplete the farm, so we must offer every inducement to keep the boys at home Try to make your homes the pride of your children so that though they go on a visit to town, they may see, at least, few homes more attractive than their own. You can easily do it; you have generally the best opportunities. The soil on the ordinary farm is of good quality. An acre devoted to the lawn is never missed from the farm. Labor is not an expensive item, because the work of making the improvements can be done at odd times when farm work is not pressing Trees, shrubs and hardy flowers, which are no further expense than the first cost, are now very cheap. The future care of the lawn involves very little labor, as light running lawn mowers, which the boys even consider as play-things, do the work of cutting the grass rapidly, and leave the lawn looking smooth and trim. Try it, there is nothing to lose, but much to gain. There is besides money in it. Who does not acknowledge the superior value of the farm which has a neat dwelling, situated on a broad lawn, nicely laid out and well cared for, and planted with a variety of handsome deciduous and evergreen trees, artistically located, and a few beds of pretty flowers as finishing touches to heighten the general effect—the ordinary farm buildings being situated some distance in the rear, and all the objectionable parts screened from view by trees and clumps of shrubbery; and along the side of the public road, a line of hard maples or other equally desirable trees. All other things being equal, do you not look on such a place as the ideal farm? I know you do. I do, and often wish I was the owner of such a farm.

Within recent years the value of decorative horticulture has attracted the attention of several of the great railroad companies of this country, particularly those operating roads in the East. They employ it extensively about all the larger depots along the lines. Thoroughly capable landscape gardeners are permanently employed to direct all the operations. All the available ground in the vicinity of the depots is judiciously and carefully laid out, and tastefully planted with trees, shrubs and flowers; and the grass is always kept short and green. The effect, as may easily be imagined, is very pleasing to the travelers. This work is certainly very commendable and does great credit to these companies.

Beautifying School Grounds.—The beautifying of our school grounds to some extent with trees and flowers is a question now being widely discussed. I deem this a subject of vital importance for many reasons, too numerous to mention here; I can only trust that, ere long, we may see every school ground throughout the country so ornamented.

Materials.—There is no lack of materials to use in decorative horticulture. Trees, shrubs and flowering plants of suitable kinds are in abundance, and sufficient for the purpose, even though our rather severe climate precludes the culture of many beautiful sorts. But the kinds we have are already so numerous, and the desire to use them all is so strong and tempting, that much wisdom and self-denial are required to choose only a sufficient number of the most appropriate sorts for the location and space they are to occupy. The general tendency is to over-crowd. It is so hard to satisfy ourselves with one tree when one is sufficient for the purpose, and our judgment even tells us so. The love of flowers has that tendency even more strongly. While their culture is always commendable, great care must be exercised in selecting them, and giving them their appropriate place. The flower garden or border is the proper place for a large and general assortment—a bed or two perhaps being sufficient to tastefully embellish the lawn.

Let me conclude by hoping that the taste for decorative horticulture already making rapid progress, may quickly become universal, so that in the future every town and village lot, and every country place and farm home may be tastefully adorned with fine lawns, handsome trees and beautiful flowering shrubs and plants.

SOILING VS PERMANENT PASTURE.

By HON. HIRAM SMITH, Sheboygan Falls, Wis.

Innovations in Methods.—I am well aware of the prejudice existing, and the suspicion felt, towards any innovation in the old established methods of farming. We have all been brought up to regard the pasturing of animals as the true way to keep them through the summer, cutting hay mainly on which to winter them, and many who do not figure very closely, or reason very logically, conclude that there is no better way of keeping animals than the way they were taught; but the competition existing in all branches of business and trade has forced many either to abandon the work they were engaged in, or devise some means by which they could increase the productions of their farms, and add to the animals from which they received their remuneration for their work.

Milch Cows Require no Exercise.—It occurred to me some years ago that soiling cattle from the green crops that grow upon the land, could be done with less acres than to pasture the cattle. Of course, many will think that this is a poor way to keep cows, and we often hear the objection that they ought to have some exercise. It has been satisfactorily proved, by repeated experiments, that an animal that chews a cud requires but little, if any exercise, and a cow that is producing milk does not require any exercise at all. I have tried it, and many others, and I think we are fully convinced that a cow that is giving milk does not need any exercise any more than a horse that works on a tread-power. The elaboration of milk is as great an exercise as the elaboration of power from the feed the horse consumes to apply to the tread-power. Therefore, the next question is a question of money. How much more stock can we keep? How much more food can we get from an acre that is left to nearly mature in a proper soiling condition, than we can to let the cows roam over the land? He who has watched the habits and characteristics of cows knows very well that the cow will visit every rod of the field she is in, and if, say, one animal occupies two acres, every foot square of that soil is tread upon every day that they are in the pasture.

It is well known by those who have observed closely that a cow, or any other animal, for that matter, that travels over the soil to get its own living from cropping the grass, fouls and treads down two-thirds of all the grass upon that acre, so that it is but a matter of economy to maintain our position. If we can keep three cows where we kept one, here comes in an opportunity to make our business more remunerative. If we have been working hard, living without many of the comforts and none of the luxuries of life, and found it difficult to meet our taxes, and if, by putting on three cows where we had one, certainly we can thus better our condition, and at the same time better our land, for the more stock we keep, the more fertilizers we shall have to raise larger crops.

Soiling and the Silo.—The history of soiling in this country is somewhat analogous to the history of the silo. It has been found that by raising a crop of fodder corn and putting it into the silo every acre will winter three cows, and there is hardly one acre of meadow in Wisconsin that will winter one cow. If we take into consideration how much we have gained by the silo, we shall be easily convinced by a little experimenting and observation how much we shall goin by soiling our cows instead of pasturing them. After I have been at this business some six or eight years, it seems as though it ought to have been thoroughly understood long before this. I get somewhat impatient sometimes at the slow progress that has been made. After experiments have repeatedly demonstrated, and the results of such experiments have been published, it seems almost superfluous to talk in favor of soiling cows.

Keeping Cattle in the Barn.—There is another consideration that we should look at. In the fore part of the season the ground is soft, mellow, physically all right to produce a crop. The frost has done its perfect work and left the soil in a loose condition, so that the crop may grow and flourish and have a chance to mature as nature intended; but if we put on every two acres a heavy animal, weighing from ten to sixteen hundred pounds, trampling over that ground, treading it in its soft condition, packing it down closely, it gets it into a condition where the soil can furnish hardly more nourishment than a stone. It has been packed so that it will not give forth fertility or moisture. A plant to live must have moisture, must have room for the roots to grow. They will grow, as you know, very little after the first of July, and consequently we almost universally have dry, short pastures for the cattle, and they soon run down in their production and become of very little value after July or August; not so much because there is hot weather, but because the land is packed so closely that the plants cannot grow. There is not the slightest doubt that the crops will be in better shape, if the cattle are kept in the barn.

Expense of this System.—Many urge sincerely and honestly the great expense of this system; but if you will take your pencil and figure the expense, it looks so small that you are almost ashamed of it. One boy, seventeen or eighteen years old, will take a team and go into the field of clover, or corn, or millet, and get sufficient in for the night's feed and the next morning's feed, and clean out the stables, and get it all done in half a day. After his milking is done, there is actually only a quarter of a day spent with one man, and his wages amount to sixty cents a day, if hired by the month, so that it costs fifteen cents to soil one hundred head of cattle every day in the year. I doubt if it takes any longer than it used to do when we drove the cows out to pasture, and had to go out and hunt them up and gave them nothing in the barn; they had no inclination to come to the barn, they had to be driven into the yard, and it took a good deal of time—quite as much, I think, as it now takes to soil the entire herd. If some wealthy man wanted his farm well taken care of, and should say to me, "if you will take this one hundred acres and twenty cows and take care of things properly, you may have all that grows on it," and another man with two hundred acres and eighty or one hundred cows, told me he would let me have the farm at halves, I would jump at the chance to take the dairy farm well equipped with a silo and everything, rather than to take the small farm and have it all. I couldn't afford to do it. It would give me no wages. An acre of land will produce more feed for summer feed than the best two acres of meadow in Wisconsin·

To Double the Farm's Receipts.—Here is an opportunity, with the system of the silo, to double the receipts of the farm. As many again cows can be kept at very little more expense, a few hired men more, but no increase of teams or farm machines—scarcely any additional expense except a little more hired help, and the vast increase in the production will warrant four times the expense it will cost. Corn put in the silo makes a great deal better feed than hay, and makes as good butter as ever was made in June, and the change from summer to winter dairying costs almost nothing. It may be done gradually; the cost is nothing, and there is all the time an increase of production.

Now, if you can, by adopting these methods, throw aside your old prejudices and quit reading accounts of the census reports of the grass crop, you will find it will pay; it will figure in your bank account. I have sometimes, in an early day, wintered in the lumber woods, taking a cow along and keeping her ten or twelve weeks, never out of the stall and never producing better. Prof. Daniels, at the University, has for years, put a new milch cow in the stable from November till May, and the experiments have proved that the cow does not need exercise; she will produce more without it than with it. There is a constant loss when cattle are traveling over the pasture looking for something to eat.

About my Silo. — Somebody has asked about the silo. My first silo I filled with corn, and fed to ten cows in the barn. I filled the silo from less than three acres, and kept ten cows over the winter, and three cows until the last of August so as to see what the effect would be in the production of milk in the winter. They were confined in a small dry yard; there is a shed in the yard, and water from a spring, running through a pipe. They had plenty of water and all the ensilage they could eat, and eight pounds of bran. We fed a little hay, but they did't care for it; therefore I fed the cows all winter until the last of August without any other feed, practically, but ensliage and wheat middlings or bran.

Discussion.

MR. SHERMAN.—Is it practical to feed ensilage the year around?

MR. SMITH.—I am satisfied that it is practical, although I would give a change—different kinds of ensilage, a little clover, and a little corn, and always a little dry hay, if they care for it. The milk from those cows was weighed and computed against the milk of three other cows running in the pasture, and they did equally well and only ate what grew on one acre, whereas the three in the pasture ate what grew on six acres. That is the practical result of the experiment.

MR. SPEAR.—Have you had any experience with clover ensilage?

MR. SMITH.—I have put in a second crop of clover with good results. It is the cheapest way to handle a second crop of clover, and the first crop also.

MR. CLINTON.—What crop would you raise for continual soiling?

MR. SMITH.—I know of nothing cheaper than corn ensilage. Let that run until about the 20th of June when the clover begins to blossom, and that is in good condition for soiling food. We could use the clover for soiling only about ten days, beginning about the 25th. of May. Then, the clover is good enough, and upon good productive land you can get three crops of clover, that will carry you until the fodder corn is in the roasting stage. Fodder corn, if cut before there is any appearance of ears, has but very little value; it is a great waste to cut it until it is near the roasting stage. When it reaches that stage it will do to cut, and you can feed that corn until you open your silo in the winter. There is no difficulty in this climate in having a succession of crops that will do better, with a greater variety, than almost any other method of feeding cows.

There has been a good deal read and published about permanent pasture. Some of you may remember that Prof. Brown, of the Agricultural College of Canada, two years ago, was very enthusiastic over what he called a permanent pasture. He sowed some twenty-five or thirty different kinds of grass seed, and reported very large results the first year; but after two or three years it ran out; only four or five kinds of grasses could be found in the field. I visited that farm last year, and asked the farmer how the permanent pasture turned out, and he said: "It is no good; you can go and see it." It had proved a failure, comparatively, and while I was there, in October, I am satisfied that one cow would eat all that grew on six acres, and it could not be depended on to keep up the flow of milk. We have still to find out that there ever was such a thing as a permanent pasture except from native grass or the June and white clover. Of course, pastures can be improved by fertilizing, and made to produce a good deal more than they otherwise would, but they cannot be made to produce more than one-half, if the cows are allowed to travel over them.

PROF. NORTH —You are aware that there are permanent pastures in England and Scotland?

MR. SMITH.—Yes, but I doubt if there is one of them which can produce anywhere near as much as a soiling crop, for the reasons I have stated. In France they seem to be aware of that fact, and although they allow their cows to crop the grass from the field, yet they have a long frame on wheels, the cows are put in stanchions and the wheels are rolled up until they eat just within their reach and then they are wheeled along farther. They can't tramp and waste the pasture, nor can they waste their substance in extra exercise. This, however, is not what I understand by pasture where cattle range at large.

MR. GORDON.—Don't you think that cows need a good deal of sunshine?

MR. SMITH.—Yes, I think they do. If you have a good, dry yard, perfectly adapted to the business, they can get just as much sunshine as there is. Of course, we don't keep the cows in the stable every minute.

MR. KELLOGG.—Why do you give your cows warm water in the winter?

MR. SMITH.— Because we think we save a little feed, and I don't know as we are certain about that. The experiments don't quite back it up. Chemists told us that it required the expenditure of food to heat water that was down to forty degrees up to ninety-eight or one hundred, as the cow must have it. I think the main reason we have adopted the warm water is that we think we save some food, and the cows certainly appear to enjoy it. They drink more of it, and if they give a little more milk, even if it don't make any more butter, we get a few more pounds of milk, at any rate.

MR. BROOKS.— Do you cut up your corn that you feed in the summer?

MR. SMITH.—No, I do not, unless it is past the roasting stage, but I take it green from the field when I feed it whole.

MR. MCKERROW.— Do you think you ought to deprive the cows of exercise?

MR. SMITH.—They seem to enjoy themselves. You see, a cow will chew her cud six hours every day, if she is properly fed, and it is about as hard work as chewing gum.

QUESTION.—Do you think the vitality will continue in their progeny from generation to generation, if deprived of exercise?

MR. SMITH.—I never was a man to look into futurity, but I don't know of any reason why it should not improve them.

MR. HOXIE.—Do you allow your corn to wilt before you draw it in?

MR. SMITH.—We cut it in the morning and let it wilt.

QUESTION.—Do you feed your cows ensilage before or after milking?

MR. SMITH.—Either way, both ways. I feed two feeds a day of ensilage.

MR. KELLOGG.—Is the idea of Southern corn being the best going out, by experiment?

MR. SMITH.—I have seen no results bearing upon that. I do not think there have been satisfactory experiments on the subject. I have always been satisfied with it. The stalk is tender and juicy, and we can raise more corn on the acre of that kind than any other kind. I have made ensilage of four or five different kinds. As I say, I raise mainly B. & W. corn, but in order to begin filling the silo early, I raise some of the Wisconsin White Dent, which has a very heavy crop; there will be fourteen or fifteen tons on the acre, generally, and it makes very good ensilage. It ears pretty well, and we can get to work at least about two weeks or ten days earlier than we can on the B. & W.

MR. LOUIS.—During this winter I have listened to the dairymen at the various institutes, and there seems to be an idea in our State that the corn must be almost in a matured state to go into the silo for food for the cows. From a breeder's standpoint, I think that in time it will become dangerous to the breeding qualities of the animals. What I call mature is what I call ripe.

MR. SMITH.— I have seen some very bad effects from corn getting ripe and being fed. One man at Oshkosh had read that the corn should wilt three days after being matured. Then he read that it was better to let it stand in the shock, and he did that and the consequence was that his corn was hard and dry; it did not have moisture enough to heat up to the proper degree and he nearly lost his crop. My impression is that when it is in the roasting stage, just big enough as we pick it to eat ourselves, it is just in the right condition for the cow. I don't think we ought to use our cows much worse than we use ourselves.

MR. CHAFFEE.—Can you get the B. & W. corn in your locality to the roasting stage before it freezes?

MR. SMITH.—I have never had any trouble.

CAP'T. ENOS.—Are you far enough from the lakes not to feel the effect of the lake breezes?

MR. SMITH.—The lake breezes effect poor land very badly; they don't seem to affect rich land very much. We have frost earlier than they do within a mile of the lake.

A GENTLEMAN.—Upon my farm I have experimented for the last three or four years. I have been soiling my herd of cows for the last ten or twelve years, as the pastures began to fail. Last year I made a couple of experiments. I measured off the same quantity of land in the same field and got this large corn that grew up twelve or thirteen feet high, and side by side with it the Evergreen sweet corn, and the result of two or three experiments was this: On the same amount of land, ten square rods, measured off, that sweet Evergreen corn beat the big corn. The percentage was not very large, but when you take into account the avordupois of the products of the two pieces of land, the percentage was quite considerably in favor of the sweet corn.

MR. FLEMING.—In what stage of maturity were these two kinds of corn fed?

A GENTLEMAN.—They were planted at the same time, and the experiments were made, first with the sweet corn, then with the large corn, then back again to the sweet corn and back again to the large corn. Perhaps the sweet corn was a little more matured, but we alternated between the two, and in every instance the sweet corn came out ahead. We kept it up until we were obliged to cut up the corn.

MR. FLEMING.—At any time when you were feeding the big corn had it got to its best?

A GENTLEMAN.—Yes, the last experiment, particularly. I watched it very carefully. Do not understand me that we got the same amount of pounds from the sweet corn per rod that we did from the large corn. I estimated the difference in the weight of the two pieces was from twenty to twenty-five per cent. This was for soilage, you understand, not for ensilage.

MR. KELLOGG.—Mr. Smith, how much seed did you use?

MR. SMITH.—I used about eight to ten quarts of seed to the acre, and planted with a horse drill, dropping one kernel every ten inches, and the rows are three and a half feet apart. It is thoroughly cultivated with a disc harrow before planting; then it is planted about one and a half inches deep, in rows as straight as a man will drive a horse, which is generally straight enough. As soon as that is done, and sometimes before, the team follows with a smoothing harrow that is kept going every day or two, until the corn is up four or five inches. Then the cultivator is started, one or two inches deep if we can arrange it, and that is kept going until the corn shades the ground; then the weeds don't bother any more. I plant one kernel, because, especially in our latitude, four do not do as well. If four are planted in one place, four sets of roots start out in competition with each other to get what moisture they can reach, while it is in that delicate condition striving for life. I have sometimes made the remark that it is no more sensible or philosophical to plant four kernels in a hole than to plant four apple trees in the same hole.

MR. WAGNER.—When you are soiling, do you feed in the open yards in racks or in the manger in the stable?

MR. SMITH.—I never feed the cows anywhere except in the manger, and only twice a day.

CAPT. ENOS.—I would like to ask as to the relative merits of the large B. & W. corn and the Evergreen corn, point for point, ton for ton, in the same stage of maturity.

MR. SMITH.—There are investigations in progress at the Experiment Station on that point. It requires a great deal of patient work, which has to be duplicated several times to be reliable, but the work is being prosecuted there.

CAPT ENOS.—I will state that my old Scotch farmer and myself have arrived at the conclusion that we plant no more of the big corn, that is after three years' trial. We have concluded to fall back on the sweet corn alone for soiling purposes.

MR. SMITH.—I think Capt. Enos will fool away two or three years' time, but he will have to give it up. Eight years ago I thought and talked just as he does now; I went around and harvested about eight tons of Evergreen sweet corn, and got from sixteen to twenty tons of the other, and forty-five pounds of the big corn makes a pretty good daily ration for a cow, and especially a Jersey cow, through the winter. The difference in the amount greatly overshadows the supposed better quality.

MR. GORDON.—The last experiment, published by the Experiment Station of the State of Minnesota give us experiments with three crops of corn, as to the nutritive value from the silo. Prof. Porter groups the corn as to nutritive value in this way: First of all in nutritive value, the dents; second the flints, and third the sugars. Among the dents, first, the B. & W., in the roasting stage; second, B. & W., in an immature stage; third, the Pride of the North in the roasting or glazed stage; then one flint comes in as an accident, then comes in the rest of the dents, including almost all of the Southern and Western dents. Then comes the group of flints, and last of all comes the Evergreen, and Stowell's Evergreen is almost at the lowest point among the sugars, and Prof. Porter recognized very clearly that that range applied particularly to the Northern States.

CAPT. ENOS.—That is for ensilage purposes, not soiling?

MR. SMITH.—I think they are practically the same.

MR. ROOK.—I have raised B. & W. corn for summer feeding and for ensilage for several years and found it very profitable, when my neighbors had nothing to feed their cows, and it was easy to induce a great many to plant a little for summer use. After the first season they would nearly all say: "I will never raise that corn again; I don't want to handle that great stuff." But I don't find it so hard to handle.

MR. SHERMAN.—How do you cut the corn ready for the machine, Mr. Smith?

MR. SMITH.—I cut it with a Champion self-raking reaper.

CAPT. ENOS.—Do you keep all the sweeps on?

MR. SMITH.—Yes, they act as reels. The ordinary rake isn't heavy enough and at first we put a man behind with a garden rake to help the rake, but it occurred to me that if we weighted that rake it would be all right, so we weighted it with a bar of iron, and had no further trouble. It will not do to have new knives on the sickle bar, they should be worn off short; it will break a new knife; old blades are just the thing. A good deal of my corn was thirteen and fourteen feet high, and we had no trouble in raking it off. It does not come off quite in the nice gavels like grain, but it is easily picked up; let it lie in any shape. Single stalks will weigh from three to nine pounds. We have two poles on a truck, put on a bolster in front, leaving it behind, under the bolster, so it is just high enough to clear the ground. We simply end it over on the pole, and it is very easily loaded. I have heard a great many say that it is impossible to cut with a reaper, but you put a good team on an old Champion reaper, take one row at a time and drive a good fast walk, and the trouble all passes away.

MR. SHERMAN.—I visited Mr. Fargo, at Lake Mills, and he tells me he raised B & W. corn seventeen feet high. I don't see how you could cut that with a reaper.

MR. SMITH.—It doesn't make any difference about the height of it. The end strikes the ground and drags it off; but there is practically no difficulty.

PRACTICAL EXPERIENCE WITH ENSILAGE.

By **WELDON VAN KIRK, Winnebago County, Wis.**

The Silo Appreciated.—It goes without saying that the silo is coming to be appreciated. So far as we have had a chance to observe, there is a healthy, growing sentiment in its favor. It is a fact that the prejudices so long, so persistently and so sensibly entertained against it, by the mass of our farmers who have gotten the greater part of their education in the hard school of experience, are becoming extinct just in proportion as the red tape, and I may almost add the superstition, that have so largely made up our knowledge of it in the past, dies out. Is it any wonder that the matter-of-fact man of small means should look with distrust on a system so long and so poorly manipulated by men with more money than good judgment, and whose chief satisfaction—for there was no profit—was derived from the fact that they had something that a poor man couldn't afford to have? It is to the credit of Yankee ingenuity that so good a thing as the silo should be recovered from among the projects of the millionaire farmer, and brought within the easy reach of any man who has a grain of energy that he cares to exert in that direction.

The Silo Simplified.—Plans for building and methods of filling and emptying, once thought to be imperatively necessary, that practically placed it beyond the reach of the average farmer, are now known to be useless, and worse than useless. Year by year the whole matter has been simplified, the cost reduced and the production improved. For example, we were told, only two years ago, that the lining must be of planed, matched floor boards, at a cost of from $18.00 to $22.00 per M., and most of us believed it. In our own experience we were unable to get that grade when we built, so put in common lumber at $11.00, and saved our money by it. For all practical purposes we find it just as good.

The Round Silo.—We have no hesitancy in predicting that the orthodox silo of the future will be round. It is easy to compute that this plan will still further reduce the cost, and will effectually do away with the corners, where nine-tenths of all our losses occur. Those having buildings or parts of buildings which they wish to utilize may devise some way of rounding the corners and thus secure the same results; but I am of the opinion that a radical change from the old plan of building square corners is necessary to obviate the difficulty.

It may be excusable on the plan of thoughtlessness in the man who hires all his chores done, to *locate* his silo across the barn-yard from the stables, but he will pay dear enough for it in the end.

The Crop to be Depended On.—The question that seems to us most imperatively to demand the attention of ensiloists at present is that of the crop to be depended on. Prof. Henry says that red clover and corn are the crops that the farmers had best fall down and worship and not be running off after strange Gods. Our silo has been filled two seasons, both with the large southern ensilage corn. A year ago last summer, on account of the drouth, it proved to be the best thing we could have planted. We were so well pleased with the large growth that it made when other varieties were a comparative failure, that we made the mistake of depending entirely upon it the past season, notwithstanding the cold, backward spring made it impossible to begin planting before the middle of May.

Filling.—The first year, having given up all hope of seeing any ears, we commenced filling the last week in August, and without waiting for the corn to wilt. The result was sour ensilage. Later on ears made their appearance, and before the last of it was in, they had nearly reached the glazing stage.

In feeding it out, we found that on the top sweet, and very much better than that put in first.

This year, thinking to improve by last year's experience, we waited until the last week in September before commencing. Within a week from the time we began, the frost came, and the general appearance of the corn field reminded one of the cedar swamps of Peshtigo, killed, but not consumed, by the great fire of 1871. Had we possessed the good common sense that it would seem any granger ought to have, we would have rushed it into the pits at once; but that erroneous idea that each successive day's filling must remain uncovered until it reached a certain heat had possession of us, and unable to bring ourselves to a point where we dare go against the doctor's orders, we took it slow and let the leaves dry up, except as we were able to prevent their doing so by cutting the corn and throwing it into large gavels, five or six of which would make a load. Dry weather followed, or heavy losses might have resulted from that method of handling.

Slow Filling not Necessary.—I have come to be most emphatically of the opinion that slow filling is not necessary to the making of sweet ensilage; that much more depends upon the crop having come to maturity before being put in, than upon any particular method of filling.

Planting Native Corn.—Our plan for this year is to plant a part of our acreage to some native varieties, something that we can begin on early, and thus get through if possible before frost comes. We shall, of course, not get as many tons per acre, but we hope that what we lose in quantity will be partly made up in quality. The fellow who, day after day, will handle the B. & W. corn and not stop occasionally to wonder if the water he is lugging round is really charged with anything of very great feeding value has more muscle than brain.

Covering not Necessary—Perhaps in regard to no other matter concerning the silo has so many erroneous theories been entertained, and one after another been exploded, as in the matter of the cover. Since the time when it was thought necessary to put on one-half a ton of weight to every of ton ensliage, we have learned that it is not absolutely necessary to put on anything, and while economy may dictate that it is better to put on a foot or so of cut straw, green marsh grass, or something of the sort, rather than to sacrifice that amount of ensilage, yet no fears of any extensive loss need be entertained if no cover at all is provided.

The past season we expended a good deal of energy tramping the cover for the purpose of making it follow closely after the ensilage, as it settled, and thus exclude the air. We were somewhat surprised on opening it, to find as much mould as we did, but have since figured out that the only result of our tramping was to shatter the otherwise air-tight blanket of mould that kind nature was forming in that buckwheat straw, and in so doing let the air through and necessitated the forming of another layer underneath.

Discussion.

MR. SHERMAN.—I built a silo, but failed to fill it. It is long, and one end opens towards the cows and the other towards the sheep. I want to know if any one here has had experience in feeding ensilage to sheep and cows and horses.

MR. MCKERROW.—On the Sherman farm, Springbrook, they have been using ensilage for several years; also the Messrs. Brewer, who are large sheep feeders, and they all tell me ensilage is giving good results in feeding sheep. Prof. Cook, of Michigan, tells me he has had fine results in the same line, and I have failed to meet any sheep feeder who has been dissatisfied with it.

MR. KELLOGG.—I put in a silo last year; I have been feeding two horses a bushel apiece, once a day. I have been feeding one brood mare, one driving horse and two colts, and we give them that which is not the best, taken out of the corners, and they like it and are doing well on it.

MR. THOM.—I have a horse which I cured of the heaves this winter with ensilage. It has had the heaves for four or five years, and has had ensilage and oat straw exclusively during the entire winter and to all appearances there are now no signs of its having the heaves. It has been in harness nearly every day this winter.

MR. HOXIE.—I think there is quite an important point in filling the silo—rushing it in. We have been taught heretofore to put it in one day and wait two or three days for it to heat up. It seems to me that it is a very important fact to know that if we get caught with a frosted field of corn we can put on men and get it in quickly, before it spoils.

MR. FAVILLE.—More than half of my ensilage was put in after the corn froze. It caught our common Dent corn pretty badly, but did not affect the B. & W., standing side by side. The B. & W. was perfectly green, and the leaves of the other caught it. We commenced filling the silo and had a hard frost two weeks afterward, killing everything, even the B. & W. We hurried it into the silo, and the ensilage from the last is sweeter and better than the first that we put in. If it had rained, however, during the time, I have no doubt we should have had a poor mess of stuff. I don't think the frost did it any harm. There was no frost in the first that we put in; it was perfectly green. In the corners there was quite a difference in the quality from that in the middle. It was not rotten, but it was vastly more acid.

MR. HIRAM SMITH.—I think if the corn is just in the roasting stage, that there is no sort of trouble about filling the silo as rapidly as we please. In fact, it was thoroughly tested last year at the experiment farm. You will notice, in the bulletin of Prof. Henry, that he filled it in one day fourteen feet deep. The corn was cut and put in as soon as they could do it. I think if it is all filled in one day, it will heat up. There is air enough carried in with the feed as it passes from the carrier into the pit to heat it up. Very green corn, of course, would not do so well.

MR. THOM.—I know a silo holding three hundred tons of corn say in the roasting stage, filled four feet at each filling, heating to one hundred and twenty. That silo does not contain a pound of ensilage that any stock will eat; it is as black as your hat, all the way though, and I would like to know what is the matter with it?

MR. SMITH.—Do you know whether the pit was made properly—was it air-tight?

MR. THOM.—It is as well made a silo as I know. It is inside the barn; it is made of two thicknesses of matched lumber, with tarred paper between. The corn was cut from the stalk.

MR. SMITH.—I don't know of any reason. It is one among a thousand instances. The great majority of silos that are filled come out perfect, and I find the corners will come out as good as the rest, if before filling the second day they are pitched out, and the heated ensilage from the center pitched into each corner, where it is colder.

MR. SAWYER.—Had the silo spread any?

MR. THOM.—No sir. There is one point that I should state. The man filled the silo from top to bottom without going near the inside. It was not spread or tramped at all. It was filled in the center of the silo.

MR. FLEMING.—I can readily see from that statement one of the reasons for the ensilage being in the condition you say it was. Being simply pitched into the silo, and not evenly distributed in regard to the heft of it, the lighter portion of the ensilage dropped near the wall from the carrier, while the heavier portion, of course, was thrown over and settled much more than the other. The fine portions did not have sufficient weight to pack, and, of course, left spaces through which the air passed and penetrated the whole mass.

MR. THOM.—We visited Mr. Byron Snyder's silo, and saw where the ensilage had drawn away from the walls.

MR. PEFFER. — If the gentleman's silo had been built like mine, I don't think that would have happened. I made mine about two inches smaller on the bottom than on top, and as it settled it always got harder instead of loose.

MR. GORDON.—I saw on the farm of Mr. Morgan Manuel, perfect clover ensilage. I asked him how he did it. He said that he cut the clover when the top blossoms were brown and the lower part of the stalk was a little woody; cut it after the dew was off, and put it in straight, without cutting or any further work; kept it thoroughly distributed, and then weighted it a little with plank and other weight, just sufficient to overcome the natural tendency of hay not to settle. It was the most perfect article of food I ever saw in my life, rather brown and green; had not any of the Limburger smell that clover ensilage generally has. He says the secret of clover ensilage is in putting it in in exactly that stage. I saw one silo where the clover had been put in alternately with corn and not cut, but the clover smelt like Limburger cheese; the corn was all right.

MR. HODSON.—We put some in this year, and cut it and it is a perfect success. Since we began to feed it, the herd has gained about two pounds a day. I venture to prophesy that some day not far off all intelligent dairymen will put up half of their ensilage in clover.

MR. SHERMAN.—I have had bad luck. I put in five jags of clover. It was not very good clover; it was a little past the green stage, rather getting ripe. It did not heat up satisfactorily. I dampened it and tramped it, and made a square billet of wood and pushed it down, but still I haven't anything very satisfactory.

MR. FAVILLE.—I filled the silo with clover two years ago, and it was very satisfactory. I haven't filled it since for the very good reason that we haven't had any clover. Our cows ate it very greedily, and gave milk on it just about as they would eating green grass.

MR. SHERMAN.—I filled my silo because I wanted some of the protein these men are talking about at the experiment station. I do not believe the hogs will touch it, but I am sure the cows will eat it when they can.

MR. THOM.—Is there a man present who owns a silo who wishes he had the money back that it took to build it. I would like to see the hands of those who own silos. I see twenty-two. That's pretty fair for a beginning.

MR. GORDON —I would like to have the money back from mine, so that I could build a larger one. I believe that the secret of all this matter rests largely in furnishing one's mind first with a theory—the correct theory of ensilage. We have been talking broad. It is very useful to get the practical side of the question presented, with all the mistakes and all the successes of the silo, but I believe we must get firmly into our minds the complete theory of ensilage so as to be able on our own farms to meet the accidents and incidents that we have to meet and never have seen before It was a new thing for me to get up in the morning and find all my corn frosted and not a bushel in the silo, but Edward Fries' little book, that costs fifty cents, gives you the theory based on the natural law of what ensilage is, that you may meet those emergencies very easily by exercising common sense. For instance, I found that the corn had dried up one-third of the way one year. I was puzzled to know what to do, but Fries' book set me right about it, without having to look through one hundred speeches of practical men. I believe you had better, all of you, send for this book, which is the only book in the English or French language that gives completely the theory of practical ensilage. It is Edward Fries' book, sold for fifty cents by the WESTERN FARMER COMPANY, Madison, Wis.

MR. KELLOGG.—I put up a silo last season and filled it with B. & W. corn. The lower leaves had yellowed for three feet on the stem, but it is coming out very satisfactorily, except the corners. The boards on the inside were unplaned, and that is where I think I missed it; I shall probably have to put on a third thickness of boards, and planed boards up and down. I am satisfied that it pays, even for twelve head of stock.

MR. THOM.—Don't put the boards up and down, for the reason that if two boards are set up this way, you have a chimney that runs clear to the bottom of your silo, to let the air through the whole length of it. If you put it the other way, the only chance for the air to come in is at the top.

MR. KELLOGG.—Would you put in another thickness of paper before you put in that third lining of boards?

MR. SMITH.—I think, to make a sure thing, I would put in a thickness of paper, and then put cheap shingles laid six inches to the weather, the same as you do on the roof. Last year I built a silo with cheap cull boards outside and in, and then the shingles. It cost only half as much as common lumber. The ensilage kept as perfectly as in any other silo I ever saw.

CAP'T. ENOS.—I would like to hear what Mr. Hodson can tell us on the subject of uncut ensilage.

MR. HODSON.—There is one point I make against cutting ensilage corn. We don't cut ours, and there is less waste in the corners. In our silo you won't find three inches of waste, and the outside is perfect. When you fill with whole corn, the heat drives to the outside and comes up and keeps it sweet. Another thing: It is natural for a cow to chew her food, and it mixes better with her feed when she eats it. All scientific men tell us that if it is mixed thoroughly it helps digestion. The machinery of the cow's stomach is called on, having this stringy stuff in it. Everything that is swallowed passes into the first stomach, and there is somewhat of a sifting process. If she takes her food cut, more particles pass through unchanged than if it is fed to her uncut. We have tried repeated experiments, changed cows back and forth, and we find they always produce the most on uncut feed. I have noticed in killing cattle that if we feed corn-meal, say, and mix it with uncut food, it is thoroughly mixed in the ruminant, and you will find pieces two inches long in the manifold; if you kill that cow six hours after she is fed, you will find the food pretty well sifted out. The cow needs to have long, fibrous feed so as to sift it finer. I find also a great difference in the droppings of cattle. I have found corn-stalks in the cow's fourth stomach an inch long, and hay also. We have proved to our satisfaction that the large corn is not the corn for our cows; we must have the small corn. We tried the cows last year back and forth, and they would come back to the small corn every time. I am satisfied I can get net profits of forty to fifty cents a ton more in uncut corn than in cut.

MR. THOM.—Do you have to carry it in your arms to the cows?

CAP'T. ENOS.—They carry it by railroads. They do things by clock-work over there.

MR. HODSON.—I told at the institute last year that we could take whole ensilage out of the silo and feed to 27 cows inside of seven minutes.

MR. SHERMAN.—I wish Cap't. Enos would tell us the cost of the contrivance by which Mr. Hodson feeds his cattle so nicely.

CAP'T. ENOS.—I thing it may cost about $25. Mr. Hodson built his all himself. There is an alley between the two rows of cows about three and a half or four feet wide, and about forty feet long. At one end of the alley is the silo. The door of the silo opens right in front of the alley. He has built an elevated railroad, or rather he has taken barn door wheels and built a platform that runs right along within three or four inches of the floor, and right up against the door of his silo. He takes his ensilage and loads it upon that platform, and when he has enough to feed his stock, he starts off, and as he goes along throws it to the cattle on either side till he gets to the other end, forty feet away, and the cattle are fed. I haven't any doubt at all that Mr. Hodson can feed his herd of twenty-seven head of cattle in seven minutes, and not hustle around very rapidly either. It is one of the most ingenious and nicely arranged stables that I ever saw. He waters his stock on the same principle. He runs the water right in front of each row of cattle, so that his stock is watered and fed in about ten minutes.

MR. GORDON.—I would like to advise anybody who thinks of putting in an overhead railroad to feed cattle not to go to the regular dealers, makers of packing house railroads. I have one hundred and thirty-five feet of overhead railroad track. I found that it would have cost me about $225 to have that work put up, if I put it into the hands of the packer people, but by putting an iron wagon tire on the end, with couplings made at the blacksmith's shop, having my bails made at the blacksmith's shop, I got my one hundred and thirty-five feet of railroad track, to feed the entire herd and take care of all the traffic in the barn, for forty-five dollars. I believe now I shall put in two tracks behind, to cross so as to carry the manure out of the barn and dump it, and I believe the two tracks for the manure with crossings, &c., can be put in at forty dollars. On my track a child can push a car that is full of ensilage to feed fifty head of cattle. I believe it is a great saving of labor; I believe one man can feed one hundred cattle in less time than three men can otherwise.

THE PROFITS OF DAIRY FARMING.

By S. A. GERNON, Waukesha County, Wis.

Dairymen Should be More Exact.—In this time of depression in all branches of trade, when profits are very small in all kinds of business, even when large amounts of capital are invested, when competition is so brisk that there seems to be an overproduction of almost everything, the question naturally arises as to whether there is any profit in dairying, and if so, what are some of the methods necessary for dairymen to pursue in order to secure it?

The trouble with two-thirds of our dairymen is that they do not know what the income from their cows is, neither do they have any idea of the yearly cost of keeping a cow. They seem to think that all they have to do is to labor hard sixteen hours out of twenty-four, and trust in Providence to make the balance come out on the right side of the sheet at the close of the year, a task which she seems utterly unable or unwilling to perform.

To Whom Failures are Due.—It is the fashion now-a-days to lay nearly all failures in dairying to the scrub cow, and doubtless she deserves nearly all the abuse she gets; but I think far more of the failures can be traced to the scrub man who feeds and cares for her. The best dairy herd in this county would soon degenerate into scrubs if they were fed scrub rations by a scrub dairyman.

The Successful Dairyman—Must know how to select and breed good cows; he must also know how to feed, handle and intelligently care for them. If he is manufacturing the product himself, he must know how to produce a first-class article and be salesman enough to find a first-class market for it. His maternal ancestor may have made the best butter he ever ate, and the best keeping butter; but he must remember that times and tastes change, and he will do well to keep up with the times and try to tickle the palate of the man he sells to. He must know how to produce the largest amount of good, nutritious food on the smallest amount of land, and how to preserve it in the best and most economical manner. As he cannot produce all the different kinds of feed he will require, he must know when, where and how to buy the balance.

Of one thing he need have no fear, and that is the loss of fertility of his farm if the manure from his cows is properly saved and applied; and as time passes I think he will not find this to be one of the least of the items of profit.

Profit and Loss in Dairying.—While there is a profit for some dairymen, many are making sad failures. In a series of papers written for Hoard's Dairyman, by C. W. Jennings, entitled a "Cow Census," giving the statistics of the dairy business of the town of Ellisburg, Jefferson County, N. Y., some light is thrown on this dark subject. Jefferson County is one of the oldest dairy counties in New York, and stands third in the State in regard to the number of cows kept. Following are some of the figures of this census:

Number dairymen interviewed	367
Number of cows kept	5,507
Average number cows per dairy	15
Lowest average gross earnings, herd of 10, per cow	$18.10
Highest average gross earnings, herd of 5, per cow	$81.00
Average gross earnings per cow	$31.74
Average estimate of cost of keep per cow	$36.36
Average loss per cow	$4.66
Total loss on 5,507 cows	$24,480.00

Of the whole number of cows reported, 70 per cent. failed to bring in enough to pay for the cost of their keep, while of the remaining 30 per cent., 20 per cent. did not bring in enough over the cost of keep to pay their owners for the time spent in caring for them. This would leave 10 per cent. of all the cows kept in that township that were paying a net profit to their owners; or, while 10 men in every hundred were making a profit in dairying, 20 were just about holding their own, and 70 were losing money.

A curious fact shown by this census was that very little grain or mill-stuff was fed to these cows, and the ones who fed the smallest amounts of these feeds were *always* the ones showing the smallest incomes, and that where money *was* invested in this kind of feed, it was given back by the cows with interest at the rate of 500 per cent. This convinces me in this case that there were more scrub dairymen than scrub cows.

Dairying in Waukesha County.—Waukesha County, I think, can show more good dairymen to the square mile than that down east town. Let me give you a few figures as to what we are doing around here. First, let me give you a few conclusions arrived at by looking over the report of the Waukesha Butter and Cheese Factory for 1888. This factory paid out over $22,000 last year to its patrons, and now that it seems to be established on a paying basis, there is no reason why it should not receive a much larger patronage.

I find that the average price paid by them for milk by the year was 93.3c. per cwt. The lowest average price paid was a fraction less than 80c per cwt.; the highest average price paid $1.086 per cwt. As each of these men received the same price per cwt. for the same months, there is a difference of nearly 29c. per cwt., by the year, in favor of the man who furnished the most milk when it was worth the most money, that is in winter, and I think we are wintering our cows now about as cheaply as we can carry them through our dry summers. This 29c. per cwt. can be set down in this case as one of the profits of dairy farming, and the reason why there was a profit was because there was something to sell when the market was not overstocked.

Figures That do not Lie.—A few figures telling what some of our individual dairymen are doing may be of interest. These figures give the gross earnings per cow for 1888. In each case the cow was credited with two dollars for value of calf. Where butter was made and cream sold, 20c. per cwt., was allowed as the feeding value of skim-milk. No allowance was made for whey where milk was taken to a cheese factory, because when a man sells a ton of milk off his farm he sells $2.43 worth of nitrogen, potash and phosphoric acid. When he manufactures the ton of milk into butter and sells that, he sells about three cents worth of these valuable fertilizers, and $2.46 per ton I think would be a big price for any whey I ever saw. Here are the figures:

Dairy.	Cows.	Gross receipts per cow.	
1	20	$49.00	Delivered milk to factory.
2	18	49.66	
3	22	56.43	
4	16	69.87	
5	15	60.00	Sold cream in Milwaukee.
6	33	60.00	
7	19	68.00	Made butter
8	24	72.33	
9	20	74.80	
10	19	84.60	

Here are 10 dairies that average over 20 cows each. The average earnings per cow are $64.47. Most of these dairymen know very nearly the yearly cost of keeping a cow as they keep them. Taking an average of their figures, I think $35 per cow would be about the cost of feed for a year. Now, if we add $10 for the cost of caring for her for a year, then $45 is about the point where we may begin to figure the net profit. If these figures are nearly correct, then these 10 men have a net profit of nearly $20 per cow, not a very bad showing when we remember that 1888 was a very dry season with us.

We undoubtedly have dairymen with us who are realizing larger profits on their herds, where they are favorably located for retailing milk and cream, and, doubtless, others are doing better in butter and cheese production. Many, of course, are not doing as well as this, and some are working at a loss; but if they were as anxious to learn new and better ways as the successful ones are, they would soon have the balance on the right side of the ledger.

The Secret of Success.—What was the secret of the success of these dairymen? Having gone into the dairy business to make a success of it, as a business man would go into any other kind of business, they first selected their cows with a view to the kind of dairy work they wished to engage in. If butter making or cream production was the object they had in veiw, they selected cows that would produce large amounts of butter fat in their milk for the food consumed. If they were patrons of a cheese factory, they selected the cows that would give a large flow of milk regardless of quality.

This, of course, was not as it should be, but until some way is devised of paying for milk according to quality, the inducements held out to patrons are all for quantity. Having selected these cows for the obj ct they had in view, they realized that, like a threshing machine, the more of the proper kind of feed they could run through them without clogging the sieves or impairing their digestion, the larger the profit would be, and as they did not select them in the first place with a view to profitable beef production, when they cease to yield a profit as milk producers they will not keep them long expecting to make a profit on 2c. beef.

DAIRYING AND BEEF PRODUCTION.

By C. R. BEACH, Whitewater, Wis.

Beef Produced at a Loss.—It has been so often demonstrated, both theoretically and practically, that dairying can be made to pay a handsome profit on capital invested, and labor performed, that I need not stop to show the way in which it can be done. But I think that it is claimed and generally admitted that but little if any beef is produced in Wisconsin, except at a loss, or, in other words, the food used for that purpose could have been sold or put to other use, and would have brought more money. Now the object of this paper is to attempt to point out a way by which, in connection with profitable dairying, beef can be produced at a profit.

Selling Cows from the Dairy.—As I am to work along the line and in harmony with successful dairying, I will start with the self-evident truth that the successful dairyman keeps no cows but those of good age. But he will find that all are not as good as the best, and he will think it for his interest to dispose of a certain number yearly and to replace them by purchase, or, what will perhaps be better, with heifers from his best cows. The usual course now pursued, is to sell those cows in the autumn or early winter for what they will bring, usually from 1½c. to 2c. per pound. One day in the early part of the present winter I saw three good sized cows, not very old, sold for $25. Two sold for $8 each, and one for $9. I remarked that the price seemed small. The answer was "it is, but they will eat their heads off before spring, and I had better sell them."

Was there a better way by which one could have kept those cows and fed them until they were good beef, and made money on the feed they would have eaten? I unhesitatingly answer, yes. It would have required a little fine thought and planning, but so does any successful work. We do not stumble into to the best way of doing things; we have to do lots of hard thinking to "get there."

Feeding For Milk and Beef.—As these instititues are designed to impart knowledge that has come to us through pratice, rather than that which has been deduced through theoretic speculation, perhaps I can not enforce what I wish to say better than to relate a little of my experience: For several years previous to 1872 I was engaged almost exclusively in feeding cattle for beef. A part of the time I fed heifers and dry cows, and almost invariably found that they would put on more flesh on a given amount of feed than steers, and generally yield a better profit.

In the winter of 1871, during the month of February, I purchased 20 farrow cows that were then giving milk at a cost of $30 per head. I milked them until I had sold $100 worth of butter. They were then dried, and fed for beef, until grass grew, when they were turned to pasture without grain, and about the 20th of June were sold as beef to ship to Chicago for $55 per head, or $1,100, making $600 for the feed. I then thought I would buy my cows in the summer, send my milk to a cheese-factory, and feed the cows for beef during the winter.

In July I bought 20 cows, at a cost of $31.70 per head, and milked them, sending to a factory that closed the first of December. As the cows were giving a large flow of milk, I thought I would make a little butter before drying them. I made a couple of jars, and sent to a hotel in Chicago, for which I received 31c. per pound with an offer that if I would furnish them a hundred pounds a week for a year they would pay me 32c. per pound. In the place of drying my cows, as I intended, I arranged my cellar for keeping milk, and milked those cows all winter and spring, then selling them for beef at an average of about $40 per head.

I continued to furnish these parties with butter by the year, buying my cows fresh in the spring, keeping them farrow, milking, feeding, and selling for beef the following spring. In the spring of 1875 my books showed that, during these three years, I had purchased 79 cows at an average cost of $31.59, which had been sold for $40.41. The experience of these three years convinced me that I could milk cows and make beef at the same time. As times changed, and it became more difficult to buy good cows, and beef sold at less price, I of course have deviated somewhat from the original plan, but have never entirely abandoned it.

If I find in the spring of the year that I have cows that had better not be kept, or have more than I wish to keep, they are kept farrow and milked until the next spring. Then they are sold for beef, sometimes drying and turning to grass, and sometimes selling from the yard, before drying. The prices received have almost invariably been more satisfactory than to have sold them the previous fall.

Figures That Show a Profit.—Let us look at this matter a little more in detail. The cow that comes in milk in the spring and is milked to the 1st of December, weighing 900 to 1,000 pounds, would not, the last two or three years, have brought over 2c. per pound for shipping, and often less. If, now, a lot of such cows be fed daily from that time until the 10th day of May, 40 pounds of field-corn ensilage, worth 5c., with 10 pounds of wheat bran, worth 6c., and 10 pounds of good hay, worth 3c., making a daily ration worth 14c. (there are other rations equally as good, but I have mentioned this because I used it last winter and this, and know that it is both cheap and good), they will give from 12 to 20 pounds of milk per day, averaging 16 pounds, which will be worth from $1 to $1.50 per hundred, averaging $1.25, making the 16 pounds of milk worth 20c. daily, or 7c. above the cost of the rations. The manure will pay for the work, and you have for the 160 days' feeding $11.20 above cost. If, now, these cows be dried, turned to pasture, and fed five pounds of corn meal until the 20th of June—40 days—at a cost of $1.80 for pasture and $1.20 for grain, the expense will be $3. Deduct this from the $11.20 profit on milk, and you will have $8.20 as the average amount they will have payed, *above their keeping*, out of their milk. At this particular time of the year the winter-fed cattle will be out of the market, grass beef not yet ready, and your cows will therefore sell well and bring at home 3c. to 4c. per pound, live weight, averaging 3½c.; they will have each added a hundred pounds or more to their original weight (I have in several instances had a whole car-load of cows add 80 pounds each by running 40 days on pasture), without grain, and will therefore bring $35 to $38 per head, or $17 to $18 above what they would have sold for the 1st of December, which, add to the $8.20 profit on milk, and you have a net gain of $25 to $26 per cow.

You may think these figures fanciful and extravagant, but they are not, and it will not take your best cows to do it, either. We, in Wisconsin, dispose of not less than 100,000 cows annually, most of them going for canners, at less than 2c. per pound. Had these cows been handled as I have indicated, with the results as I have figured, there would be an annual gain of $2,600,000 to the wealth of the State.

Do not think I am trying to persuade you to slaughter your good cows, in order to get money. I am only trying to show how more money could be made out of those we do dispose of. Some of our teachers are continually teaching that one-half the cows in Wisconsin do not pay their keep, and they advise us to sell them and supply their place with better ones; but they do not tell us how. It would be almost wicked to sell them for dairy cows to those who do not know as much as we.

Experience in England.—In confirmation of what I have said, some twenty-five years ago Mr. Hosford, of England (as reported by Stewart in his work on feeding) made a specialty of purchasing cows under six years old, feeding them for beef and milking them at the same time. In this way he could, in 6 or 8 months, increase their selling value for meat something like 50 per cent., and at the same time realize a handsome profit above cost of feed out of their milk. He fed six cows 191 days at a cost of 27c. a day each, amounting to $311. They averaged 35¼ pounds of milk per day, which brought $1.44 per hundred pounds, amounting to $592, leaving a profit of $281, or $46.83 per cow on the milk alone, besides their increased value for beef. They had added to their live weight 84 pounds each.

Skim-Milk and Whey—I wish now to ask your attention for a short time while I attempt to show how we can utlize with *profit* the skim-milk, and the *whey* from our dairies in producing beef.

There are three reasons why we fail in our attempts at profitable beef production. We spoil our calves during the first three months of their lives. We attempt to put too much weight on the same animal, and we take too much time. The spring calf fed a few days on new milk and then changed to cold skimmed milk, and after a few weeks turned to grass and fed only sour milk until weaned, at three mouths old, will be worth but little to grow, and to convert into beef at *any age*. You can raise a spring calf that will be a good one, but he should never have green grass and sour milk at the same time, and I doubt the advisability of giving him any grass for the first six months of his life.

One of my neighbors in New York State, more than thirty years ago, raised twenty spring calves, that were kept in the stable all summer and fed on hay, bran and oats, the sour milk, and the butter-milk, together with a gruel made by soaking oil cake in cold water. They were sold at about six months old and brought twenty dollars each, and were supposed to weigh about 500 pounds.

Advantages of Early Maturity—Were we to plan to have our steers ripe for the market at fourteen or sixteen months old, and weigh one thousand to twelve hundred pounds, instead of keeping them until they are thirty or thirty-six months old, and weigh from twelve hundred to fifteen hundred pounds, our chances of making a profit would be greater. We have learned that the pig may be made to pay a profit, if mature at eight months old, but will generally run his owner in debt if fed eighteen months. Why will not this law of early maturity hold good in making beef?

Feeding a Calf for Profitable Beef.—1. I will not choose a spring calf, because for the first six months of his life I propose to feed him largely on skim-milk and whey, and from May to October it is very difficult to have these two articles sweet, and if they become sour they lose much of their feeding value.

2. Because at the age when he needs the most care I am most busy with farm work, therefore shall be apt to neglect him.

3. As he is to be raised without grass while fed milk or whey, he will not get much exercise the first summer, and the same will be true of the winter following. This close confinement for a whole year will prevent a healthy development of bone and muscle.

4. I propose to sell him at fourteen or sixteen months, and this time in the care of the spring calf will fall in the summer when prices are generally at the lowest.

5. As profitable dairying is one of the conditions to accompany profitable beef production, and that generally means winter dairying, I prefer that the calf should be dropped the last half of September or the first half of October. This calf will then have time to grow to a size that will enable him better to withstand the extreme cold of winter.

Having thus settled that our calf should be a fall calf, and that we are to have him ready for the market in fourteen or sixteen months, what and how are we to feed and how handle him?

The first sixty days of a calf's life are most important. If neglected or mismanaged then, he will rarely recover. Governor Hoard, at the Janesville institute, named four conditions that he considered absolutely essential to success. The food should be sweet; it should be fed warm, and often, and the calf should be kept dry. I most heartily indorse what he said.

For the the first ten days the calf should have new milk. Skim-milk may then be substituted, feeding from two to three times a day, the milk to be sweet and warm. We often injure calves by feeding too much at a time. After a few days ground flaxseed may be added to the milk. At five or six weeks old the calf will begin to eat a little fine hay, which should be kept within reach, and soon will lick a little wheat bran, and at two months will eat whole oats. If you have carried him up to this time in good shape, the critical period is past. After this, the milk can be gradually lessened, but to produce the best results it should be kept up until the calf goes to grass in the spring. After the calf begins to eat hay and grain, he should have water daily.

Cost of Keeping.— Let us now try and determine what this calf should cost for keeping from the middle of October to grass time, 200 days. His food will, of course, be varied in kind and amount, but we will allow the following for an average daily ration:

12 ℔s. of milk, 200 days, 2,400 ℔s., at 25c.	$6.00
1 ℔. of oats, 200 days, 200 ℔s., at 1c.	2.00
2 ℔s. of bran, 200 days, 400 ℔s.	2.40
1 ℔. of oil meal. 200 days, 200 ℔s	2.50
1 ℔. of hay, 200 days, 200 ℔s	0.60
Total cost	$13.50

He will weigh from 400 to 500 pounds, at a cost of not exceeding 3c. per pound. As the whey of our cheese factories can be kept comparatively sweet in winter, it can be used in place of milk by increasing the oil meal, or, what is better, flax-seed gruel.

The calf that has cost us $13.50 up to grass, can now be turned to pasture and fed two pounds oats and two pounds wheat bran daily for 100 days, or up to the first of September. At 20c. per week for pasture and the grain at cost, your calf has cost you $18, and should weigh from 700 to 800 pounds. From the first of September to January, you may feed him anything that he will eat that will make him take on flesh the fastest—grass, fodder corn, shocked corn, run through a cutter, ensilage corn, ground oats and wheat bran. The flies are away, and you can make him grow wonderfully; you ought, in these 120 days, to make him put on from 300 to 400 pounds. Prof. Henry reports that he made a lot of steers, fed on corn ensilage alone, put on 3 7-10 pounds daily for twenty-six days in succession. A lot of 30 1,000-pound steers that I wintered in the winter of 1884, the following summer added 300 pounds in 100 days on pasture grass alone. The cost of the feed for this steer for the last 120 days ought not to exceed 10c. per day; he is on grass for more than half the time, making the entire cost $30, and if he weighs 900 pounds and sells for but 4c., he will bring $36, and if he weighs 1000 ℔s. he will bring you $40 or more. Success in this plan depends upon starting at the right time of the year, utilizing your waste dairy products. Make your calf do his best every day he lives, and sell him before he eats his head off.

Utilizing Whey. — This utilizing whey, feeding it at the time of year it can best be kept sweet, is deserving of more than a passing consideration. Sweet whey contains over 6½ pounds of dry solubles in each hundred pounds, more than half as much as new milk. If we could feed all the whey made in Wisconsin while it is sweet, it would amount to a good many hundred thousand dollars more than we now get out of it.

In proof of the value of whey for calves, Mr. I. H. Wanzer, of Elgin, in 1876, fed 120 calves whey, oil-meal, oats and bran. They were fed milk four weeks, and were sold at seven months old at an average of about $21 (E. W. Stewart is my authority).

Skim-Milk and Whey for Hogs.— While skim-milk and whey make excellent feed for hogs, they yield better in returns fed in summer than in winter. By planning to raise winter calves, we could feed in the summer the pigs we ought to sell at eight months old; and then, in the place of raising fall pigs, to eat winter slops, we could feed the slops to calves with perhaps greater profit.

Jersey Beef.—How about Jersey beef? we know that it won the first place as to quality at the late fat stock show held at Chicago. It matures early, and if it should be found that the neck of a Jersey steer made better beef than the sirloin of a Durham, perhaps he will pay for the feed he eats, if he don't weigh quite as many pounds.

50,000,000 lbs. of Beef a Year.—The people of Wisconsin consume from thirty to fifty million pounds of beef annually. We can not afford to import it, and one of the problems for Wisconsin farmers to solve is, how to make it the cheapest.

Discussion.

MR. CLAPP.—You bought your cows for $31.70.

MR. BEACH.—I take the cow when the man wants to sell her in the fall. I am not taking her at the price I buy her for a dairy cow. I am talking about cows that you want to dispose of, and not the best cows which you are keeping.

MR. FAVILLE.—Have you sold any cows this spring?

MR. BEACH.—I have a carload that I shall sell.

MR. FAVILLE.—When you get four cents a pound for them, let us know.

MR. BEACH.—Last year my cows brought me over three dollars, without drying, before they went out of the yard; if I had dried them, would have got a cent more.

MR. FAVILLE.—I have tried that plan of feeding cows, and I didn't make any money by it.

MR. SHERMAN.—Is it pratical to feed old, full-blooded Jersey cows?

MR. BEACH.—Dairymen don't keep cows so long; they can't use them.

PROF. HENRY.—My students in agriculture are going over figures in regard to some work in feeding at the Station. We are feeding several calves, keep an account of what each one eats, and at the end of about twelve weeks feeding, when the calf was about thirteen to eighteen weeks old, we went over several of the reports, and found that the calves were then taking twenty pounds of sweet skim-milk, a day. They were eating ten ounces of oats a day; the hay was so small a quantity that we could hardly weigh it. Now, upon that twenty pounds of sweet skim-milk and ten ounces of oats daily, the calves are gaining from one and one-tenth to one and seven-tenths pounds. We are getting an average of one and four-tenths gain a day for the lot, by feeding that way. Those are grade Jersey calves.

MR. BEACH.—I hope no one will get the impression that I advised giving up dairying, and going into what cows one can find; but, if you are dairying profitably, you must sort out your cows, and I am merely trying to show you how you can make the best possible use of them. Most people raise their cows, and they wish to dispose of those that are the furthest advanced and the most unsatisfactory. We don't buy cows to sell again, if we are dairymen.

CAPTAIN ENOS.—My experience in the dairy business is this: When I had a heifer or a young cow, and when I came to feed high with a view of testing that animal to see whether I should retain it in the dairy or dispose of it, that question was settled by this fact: If the animal put on fat instead of making returns in response to what it was fed, in butter and the pail, that animal was to be disposed of at any price. I went upon the principle of the survival of the fittest in building up a dairy herd, and I long ago discovered that as soon as a young cow began to put on fat in response to her high feeding that she was not the cow for the dairy, at least not for my dairy. When I found a cow that kept her condition fair, and frequently would grow thinner in flesh, that was the better cow for me. Whenever a heifer or a cow was ready to turn off, I did not ask the question, how much I could realize from that creature. I figured up that if she had been in milk for six or seven years she had earned for me from twenty-five to thirty per cent. net profit every day, and I came to the conclusion that that animal must go for whatever the butcher offered me.

Mr. Beach.—That is precisely what I propose—to get them ready for the butcher and sell them to him. We agree.

The following resolution, offered by Mr. Gernon, was adopted.

Resolved—By the farmers assembled in convention at Waukesha, that we most urgently request our legislators at Madison to take immediate steps to drive all fraudulent imitations of butter and cheese from the State.

Resolved—That we urge the establishment of a food and dairy commission to aid in this work.

ADVANTAGES OF THE CREAMERY SYSTEM.

By A. R. HOARD, Ft. Atkinson, Wis.

The Farmer a Producer.—The farmer proper is a producer, and in this age of specialities, the special producer of milk and cream will certainly have an advantage over him who spends half his time in manufacturing and finding a market for his product that only the other half of his time has produced. I have noticed that when a dairyman who has been making butter for years starts in to send his milk to the creamery, he increases his herd of cows. He becomes especially a producer of milk. He wants to send all the milk the farm will produce to the creamery; and, devoting his whole time to that end, he is better able to do it. A dairyman may be able to make just as good butter as any creamery turns out, but he must have the necessary appliances and skill to do it, and in order to make these requirements profitable, he should make up the butter for the neighborhood. It takes just as much skill and time to make 10 lbs. of butter as it does to make 100 lbs., and the latter will sell for a higher price per pound, as the dealer who buys it will see ten times the profit in the larger lot.

Increases the Value of Land.—There is another advantage which a good creamery brings to every farmer in the neighborhood of its location. It increases the value of his land. This advantage is enjoyed by all, whether they patronize the creamery or make up their butter on their farms, so long as the creamery makes good dividends to its patrons. A few individuals may have the conveniences, skill and time to make fine butter, and get full Elgin prices for it. They think it will make but little difference to them whether the creamery runs or "busts up," as the saying goes, for want of patronage. I think they are mistaken. The great majority of farmers are not situated as they are. They have not the conveniences, time, skill or ability to make first-class butter. Should the creamery close, three-fourths of the milk that went to it would be made up and sold to the grocery as store butter, at a great sacrifice in price. All around you dairying is unprofitable, cows are being kept at a loss. Your neighbors are hard up, and the mortgages on their farms are growing larger. Time goes on. You have milked cows and fought the witches in the cream so long that you think you will sell out, leave the farm and move into town. Now comes your disadvantages for the lack of the creamery system. Land is cheap. A hundred men want to sell to one who wants to buy; but this has not been your first trouble. The creamery system has been abolished and so much poor butter has been made that consumption has not been equal to the supply. Every pound of poor butter fills the place of two pounds of good, and you find the market badly over-stocked, a condition that affects all grades in price.

Decreases Bad Butter. — Another point: Were the creameries to go out of existence to-day, oleomargarine, the dairyman's worst enemy, would gain a great point, and the manufacture of it would be doubled many times. What the dairyman needs is a greater consumption to maintain and stimulate prices, and creamery butter has done a great deal to increase consumption, because it has decreased the production of bad butter. It will bear the trial of hot cakes favorably, and everybody knows how fast they go.

Dairy Butter is not Uniform.—As I have said before, I believe it possible for a dairyman to make just as fine butter as any creamery; but where it is not the special business of the farmer, it often becomes too much of a secondary effort. If the ladies make the butter, visitors take up most of the time; and a woman who would not stop a churn to receive callers, or make a cake for her table, in consequence of unexpected company, or the like; who wouldn't put off churning on Monday, when the cream was ready, in order to get her washing out, and a hundred other household duties, "just would not have any home at all"—"might just as well live in a creamery." And yet all this makes an uneven grade of butter. Scarcely two churnings are alike, and a regular customer who pays the higest prices demands these conditions, and unless there is a quantity sufficient to make a business of it, it will not pay for the time and trouble it costs.

50,000,000 lbs. of Butter.—Wisconsin produced in 1888 over 50,000,000 lbs. of butter. The average price received for this butter was 16 cts. per lb., if we judge by the value given in the census of 1885. Fully 40,000,000 lbs. of that butter was produced on the farm. The average price of the general run of creamery butter was about 23 cts. Here is a difference of 7 cts. per lb., or, in the aggregate, $3,500,000 which the farmers and the State lost by trying to make the butter on the farm.

Creamerymen as Salesmen. — Many farmers are unfitted by education or contact with the world to make a success as merchants. To get good remunerative prices one must make a study of the markets, and invent ways of reaching the highest priced customers. To do this successfully, one must keep points constantly in mind. Hence it is that creamerymen are more successful as marketmen. The tendency of farm life is to shut a man up between his own line fences, and, as St. Paul says, "measure himself by himself." That kind of measuring keeps a man in ignorance of the kind of man or butter-maker he is. He takes his butter to a country store and swaps it off, and never secures a particle of market education, because he is not selling in a butter market.

Special Dairy Education.—Besides all this, it takes a special dairy education to make the kind of butter that will command the best market prices. This kind of education the farmer is very loth to give himself. Nine pounds out of ten of the milk that produced the great mass of sixteen-cent butter would have made twenty-five-cent butter, providing it could have been taken away from the farmer as soon as drawn from the cow, and subjected to first-class creamery conditions. Hence the great advantage to the farmer of the creamery. The great mass of farmers who keep cows are not dairymen. They do not consider that they need to know any more about the principles of dairying than they did when they were doing nothing but growing wheat. Left to themselves, they make but little improvement. Something needs to be done to make them rub against one another, and thus show up their deficiencies. That something is a creamery. The moment it comes to a neighborhood every man who patronizes it is put into comparison with his neighbor. That stimulates him to increase his product. Thus the creamery becomes the center of dairy education for the little knot of men who are its patrons. The farmers need dairy education sadly. The lack of it is the great reason why they do not make more money out of their cows. There are thousands of new and valuable ideas that the well-posted dairyman has, that the average farmer knows nothing about. As long as he stays an average farmer, he will keep in that state. Make a creamery patron of him and the same man changes. He is in a current. If he does not get more and better knowledge out of it, he alone is to blame.

The Subject in a Nut-Shell.—Some one has put this subject in a nut-shell, when he said: "Within a circuit containing a hundred farms, 100 women empty 100 cream jars into 100 churns at 100 different temperatures, and 100 witches in the cream try the patience of 100 over-worked women and make 100 samples of 100 grades of butter, to be sold to 100 merchants at 100 prices, and what does it all amount to? One good butter-maker, by taking the milk or cream produced by the 100 farms, will turn out more and better butter of one even grade or quality at a much higher price, with more profit and less labor on the farms."

Discussion.

MR. MONRAD.—How long a distance do you consider it practical to haul the milk here in Wisconsin?

MR. HOARD.—I think in a dairy section the cows ought to be thick enough to make the hauling a shorter distance then they generally have to do it. I have milk that comes six miles. It is hauled by way of routes. One farmer living at the other end of the route hauls a load, picking up on the way, and takes whey back. I suppose, practically, it might be hauled a good deal further in one case than another; according to the care it receives, the kind of wagon, etc.—under the best of conditions, I should say not over six or seven miles.

MR. VAN DUZEN.—I want to endorse the statement of Mr. Hoard that farmers and dairymen learn a great deal from the creameries when they are first introduced among them. When I commenced running a creamery, about eighteen or twenty years ago, I found that the dairymen who patronized it did not want to have their cows in milk until about the first of May, and wanted them to dry up in October. After they had had the experience of a year or two, they were willing to change that—to have their cows in milk about the first of April and keep them running right up to the first of December. It is of great advantage to them to have such an institution start among them. They have the figures right before them, they know what they are getting, and they find why their neighbors are doing better than they are, and in this way learn a great deal.

MR. HOARD.—While they are waiting for the skim-milk, from fifteen minutes to an hour, as they have to do when they want the milk sweet for their calves, there is a regular farmers' institute held every morning; they exchange ideas, compare notes, yields, etc.

MR. THOM.—Mr. Hoard, what is the relative value of milk from the separator and ordinary skim-milk for feeding purposes?

MR. HOARD.—I don't know that I can answer that question, not having fed both kinds. I have fed skim-milk from the separator. I have made experiments in feeding sour skim-milk with butter-milk, about two-thirds of the former to one-third of the latter, and the lowest that I ever made it pay was twenty-two and a half cents a hundred. In that experiment I bought fourteen hogs, weighing about one hundred and forty-five pounds apiece, and kept them twenty-six days, and they gained over two pounds a day apiece. They got a pail of sour skim-milk and buttermilk, mixed, in the morning, and another pail in the afternoon. All the corn I fed them was an ear apiece. Of course, I think it would be more profitable to feed some corn with it, but I was after the experiment of finding out what I could do on skim-milk alone.

MR. FARGO.—Do you receive your milk by a test system, or do you distribute to your patrons according to the number of pounds of milk?

MR. HOARD.—We have a test system, but we don't pay for the milk on that basis.

MR. FARGO.—Is the quality of the milk improved, that is, does it grow better as you continue in the use of the test or does it grow poorer and do you get more milk one year after the other?

MR. HOARD.—This winter the milk has been very poor, but I find that is true with other people also; I don't know the cause unless it is the warmer winter and the cows drinking a good deal of water, the milk being thinned in that way. One generally notices when we have a very cold day, that it will ke less milk than the next day to make a pound of butter.

MR. THOM.—I think it is very clearly demonstrated that the more water the cow drinks, the better the quality of the milk.

MR. HOARD.—I don't believe it. I have figured my yield every day for the last three years. I know just how many pounds of milk it takes to make a pound of butter, and after a week of very cold weather—twenty below zero—we will make a pound of butter, say from nineteen and a half to twenty pounds of milk, when in summer weather it will take a pound or so more. We run what is called the Jersey vat. All the milk in that vat is from cows coming in in the fall. When we begin to put in the new milk in the spring, it reduces the richness.

MR. BEACH.—I wish Mr. Thom would tell us how pure water will make richer milk?

MR. THOM.—I am not much of a chemist, but I have heard that if a cow drinks pure water her food is better assimilated. The falling away in the cold weather in the quantity is not due to the fact that she drinks less water, but that she eats more solid matter. I think water is greatly under-rated in its feeding value. There is good feeding value in turnips, for instance, and yet there is a great deal of water in them.

MR. GORDON.—What is your rule for admitting to the Jersey vat, Mr Hoard?

MR. HOARD.—We have in reality two factories in one. The milk of any patron who has fifty per cent. Jersey or Guernsey blood in his herd goes into what we call the Jersey vat. It is run through the separator by itself and churned by itself. By fifty per cent. Jersey blood in the herd, we mean half-and-half; for instance, one full-blood would take in a native in the herd making the two average fifty per cent.

QUESTION.—Does the Jersey vat butter sell for any more than the other butter?

MR. HOARD.—We do not admit that we cannot make first-class butter out of common milk. In the fall of the year I know that the Jersey butter is much the best. In the spring, I think the other is best, but that is owing to the difference in the time of the cows comming in.

QUESTION.—How much does your pool pay for the Jersey vat?

MR. HOARD.—It averaged last year about ten per cent.

QUESTION.—Do you realize any more at the factory from that class of butter than from the other?

MR. HOARD.—I do not, but there is more butter in the 100 pounds of milk, about ten per cent.

ADVANTAGES OF CHEESE PRODUCTION.

By T. J. FLEMING, Watertown, Wis.

Our Strongest Competition—In my opinion, our strongest competition arises rather from a lack of quality than from surplus or quantity. I believe, and have maintained, that if the quality of our cheese were to increase 50 per cent., the consumption of the same would be proportionally increased. If this is true, is there not at our finger's end a remedy for this supposed overproduction? But what is the best and most opportune expedient to establish? Primary and principal comes the creation of a Dairy Commissioner, whose duty shall be to enforce all laws now existing, or which may hereafter be enacted, in this State, relative to the production, manufacture and sale of dairy products. [A law was passed by the legislature last winter establishing a Dairy and Food Commission, and Mr. H. C. Thom, of Beloit, has been appointed Dairy and Food Commissioner. —ED.] He should also advise, if not prohibit, the manufacture of skim cheese and the marketing of green, uncured or premature goods. I believe right here is one of the greatest inconsistencies of our advanced business ideas. It is a lamentable fact that, while we may succeed in getting a small portion of our uncured product upon the earliest and best market, we are doing it at a decided loss to the bulk of our product. Why? Simply and wholly because the immature cheese is not marketable, edible or digestible, and the fact of its being held in stock by the commission-men, with their very imperfect facilities, tends to deteriorate quality instead of improving it with age. What is the result? Simply that this inferior stock continues accumulating until the commission-men become fearful of the results, and dispose of it at a sacrifice, thereby establishing a price, to a certain extent, by which our better goods are disposed of. This illy-advised practice begets a spirit of dissatisfaction and distrust, and so disarranges the whole business.

Summer Dairying.—There is another detrimental practice to this industry, viz., exclusive summer manufacturing; for is it not a fact that our maximum product is made at a time of minimum value. I should like to know if there is any industry in this, or any other country, which can long withstand and flourish under such inconsistances.

To Obtain Best Results.—Thus far I have touched rather upon the disadvantages than the advantages of cheese-making. The advantages and best possible results of cheese-making are obtainable only under the cleanliest care of milk and most skillful manipulation of the same. There should be harmonious co-operation of the cow, the owner and the manufacturer. This will, doubtless, seem overdrawn, but disarrange the unison of these and you will be disappointed with the result. Milk intended for the cheese factory should be taken from cows having free access to salt, spring water and abundance of succulent food; and far removed from stagnant pools and decomposed vegetable or animal matter. These have the power of imparting disagreeable and hurtful effects to the milk being elaborated in the cow's system.

Care of Milk.—Now that nature and proper surroundings have produced pure and untainted milk, let the owner be true to his trust, and remove at once from all contaminating influences. This milk should be strained at once, and thoroughly aerated before cooling sets in. The object of this is two-fold—it removes animal and other odors, and retards creaming in the milk, both of which are very essential to cheese-making. In transporting milk to a factory, the morning's milk should not be mixed with the evening's, but if unavoidable, never be of a higher temperature. If the patronage is to a factory where milk is received but once a day, the temperature of the night's milk should be lowered to about 65°, and then removed from the water in which it was cooled, never permitting it to remain in water over night. Milk handled in this way, and coming from cows having free access to salt, will go to the factory in a much better condition than if these points are considered non-essential, and overlooked.

The Manufacturer's Duty.—If these few suggestions are rigidly followed, the manufacture of a first-class article rests wholly with the manufacturer's skill and knowledge in handling that milk. He should aim (after having studied the conditions of the milk) to incorporate the whole of the cream with the caseine in the coagulated form. This cannot be done by the prevalent manipulation. This cream which has risen upon the milk held over night becomes, to a certain extent, a separate and floating body, and not within the coagulating power of the rennet necessary for the coagulation of normal milk. In this way, people are often disappointed with the quality and quantity of their cheese product, and very justly so, for they are virtually making a skim cheese, though, at the same time, evading the penalty. What then is the remedy? Cheese the milk twice a day, as I do—or reduce this cream to a more liquid or soluble condition by repeated strainings at the factory, or, better, by the application of pure water, at a temperature of 125° to this already risen cream, and then mix the whole mass together, add the rennet and stir constantly but not vigorously for fifteen minutes. Follow this plan and I will warrant that you will be most agreeably surprised.

FARMING TO A PURPOSE OR AT CROSS-PURPOSES.

By HON. HIRAM SMITH, Sheboygan Falls, Wis.

Does Farming Pay?—There has been a great deal said about the different branches of farming. Some have complained that dairying does not pay, others that sheep husbandry does not pay—the competition is so sharp on high-priced land that they are unable to meet it. The same is true of beef and pork, and so on through the whole list, and according to the reports, it looks as if the only thing to do is for the farming community to get out of all as soon as possible. But we should remember this can't be done; we can't get out of farming. We are in it, and in it to stay.

Unfitted for Other Business.— We are unfitted for other business, and other business is not open to us. If we attempted to go in and compete with people in other branches of business, we would find worse competition than we do now on the farm. We should find the professions over-crowded. Therefore, we must make the best of the situation in which we find ourselves placed, and if we turn our attention directly to this matter, we shall find that we are not so badly off, after all; that there is a chance that we shall be enabled to pursue our vocation with greater hope of success.

Understanding Terms Used.—In taking up the question of farming at cross-purposes, it is important that we understand the terms used, that we may understand the meaning of them alike. Most of the disputes that arise among men arise from not understanding terms used in the same light. A certain gentleman was traveling in the State of Kentucky. He knew that to be the Bourbon State, and he expected to see a great deal of dissipation and drinking. He said to an old lady sitting in the same car: "People in your State, I suppose, are very bibulous people?" The old women said: "Indeed, stranger, you are mistaken, I don't think you can find a dozen bibles in this county

Two Examples of Farming.—Is there a good deal of farming at cross-purposes going on in this State? I was talking the other day with a farmer, the owner of four hundred acres of land. He had been engaged in making beef, and had just shipped his beef to Chicago, and sold three-year-old steers at $41 apiece, or $3.25 per hundred. He told me it did not cover the cost of their feed—left him no wages, nothing for his invested capital. He had kept them on pasture grass in summer and hay in winter. He had been raising beef at cross-purposes.

Another man had "got onto" the new method. He had a large silo filled with corn, marketed his beef in August when it brought a high price, and made money. The trouble was not in the farm or the surroundings; it was a question of the man's capacity to see the situation and take advantage of it.

This same rule holds in all branches of agriculture. It is not the occupation, but the means employed to carry it forward. Therefore, such meetings as this are to remedy the evils which have sprung up through sloth and inadvertence among those engaged in the business. By a careful watching of the best means, finding out who has succeeded here and there, getting his experience, we can remedy many of the evils of which we have to complain.

Hap-Hazard Methods.—A man may try to raise high-priced trotters, or he may buy high-priced Jersey cows. If he has no knowledge of making butter or of properly taking care of his horses, he is pretty sure to fail. We see very many trying to raise Jersey cows, for instance. They come in so that the greatest flow of milk is in the summer, when milk is cheap. Along about August the pastures dry up; he has no silo, no adequate preparation for winter feeding, and has to sell out in the fall. He is farming at cross-purposes; has no well-defined method; has laid no plans by which he could carefully work out his salvation. He goes into things in a hap-hazard way, doing a little of this work and a little of that, and the result is usually that there is a loss. But if a person is farming to a purpose, he will confine himself to a special line and pursue that line with all the intelligence he can bring to bear upon it.

Diversified Farming.—We frequently hear, and always will hear it when politicians address an agricultural fair, of diversified farming, and of the general-purpose farmer, and that if he fails in one line he will hit upon another, endorsing the idea that there is no proper way to pursue but to take your chances on as many odd ends as you would if you were going to buy a lottery ticket. But I say if you will pursue a straight line, get all the information you possibly can, you will be a great deal more apt to succeed. We often hear the argument made that such a man has some capital, he has had some advantages and he may run a special branch of business and succeed with it while another can not. It seems to me, that that is as much as to say that a very smart man with some money can run one kind of business, but that a poor man who don't know much of anything can run four or five kinds of business.

Special Farming.—If we will take up special farming, it will be for our interest. We will take delight in learning all there is pertaining to that particular branch of business, and the sooner the people of Wisconsin can abandon the idea that it is at all necessary that a man should raise his own flour for bread, as they used to think they must do, raise the wool and prepare it to make the clothing, or trade it for clothing, and all that class of business, the better off they will be.

Let a man pursue one kind of business and pursue it to the best of his knowledge, and he is more likely to succeed than men who are working at cross-purposes.

Discussion.

MR. PERKINS.—I have a farm partly adapted to sheep-raising and partly to dairying. Shall I get rid of my sheep and keep the cows, or get rid of the cows and keep the sheep, or shall I keep both?

MR. SMITH.— I never give or take advice as to what another man shall do. He must judge of his own circumstances. I am here only to tell what I have done.

MR. ODELL.— Won't you give us some points regarding winter dairying?

MR. SMITH. — When I commenced dairying, in 1857, we held no method of farming but summer dairying. We had all been brought up to that. I had become disgusted with wheat-raising, concluded to adopt dairying, and commenced with making cheese in the summer. The cows were so few that we run up what we called a double-curd cheese. After the dairy became larger, we made cheese every day in the summer, making butter in the fall, and the cows went dry most of the time in winter. We pursued that method until we kept fifty cows on the farm, furnishing pasture grass in the summer, and hay, mainly, in the winter, raising a very little corn, fooling away time husking, shelling and grinding it, and giving it back to the cows in poorer condition than when we commenced to husk it. This is the way we pursued our work, with as little hired help as possible, for the receipts did not warrant a very extensive outlay for hired help. We worked along a good many years in that way. When the cold weather came on, the cows gave but very little milk, and the question came up whether they gave enough milk to pay to keep the hired men and board them. You know hired men are generally awful eaters. We would turn off the hired men and get along as we could. We tried to keep our dairy at a temperature of about sixty-two degrees, to raise the cream in pans. In the course of a cold spell often the cream didn't rise, at least we didn't think it rose because it was thick and leathery. Of course, we didn't know that the cream was below. We waited until it became thick, so as to take it off with the skimmer. As soon as we finished skimming we went to churning. A good deal of the cream was unripe, and it became a sort of a mulch. We didn't know it then, but we probably lost about thirty per cent. of the butter.

We went on in that way a good many years. Sometimes there would be two hundred pans to skim and wash up, and that would be a pretty big day's work for my wife, on the day we churned. It was a very laborious business. It required great strength and left us pretty tired. We didn't think of caring to read anything. If somebody had come in and told us some particularly good story that was just out, some good tale that William Black had written, we should not have known about it or cared; we would rather go to sleep than read. The consequence was that there was no opportunity to make any progress, and, more than all, there was no desire, because our tiresome work left us too fatigued.

We pursued that way for several years, and I will give you the results. The receipts on that farm with fifty cows, with a summer dairy (and they ate everything that grew on the farm, and all that the pork sold for to buy bran) were about $18.00 or $19.00 and that was more than a good many dairymen received, but it took nearly the whole of it to pay the hired help, and some little improvements constantly necessary.

At last, we changed over to winter dairying, and commenced a new kind of business. We became satisfied that it was better to sell the large flow of milk that cows give in the course of a year, if that flow comes when butter is thirty, thirty-three and thirty-five cents a pound, than to be selling it when it is sixteen, eighteen, or, twenty cents. Therefore, we resolved to engage in winter dairying, and after we had been at it a very short time, we saw that the cows gave more milk in the course of the year—giving even from 500 to 1,000 pounds more—by being milked as a winter dairy, than when milked as a summer dairy. The main reason was that they would naturally go dry after about seven or eight months, and if they came into fresh milk in September and October, the next summer when we had fresh grass either to cut for soiling or to pasture, the fresh feed kept up the flow of milk. There is where the gain came in.

Again, we found that we had more fodder left by always feeding in the stable — soiling to take the place of pasture grass. We found that about as much would grow on one acre, to cut and haul into the barn, as would, when the cattle ran over it and wasted and defiled and trod it down, on two acres of pasture grass. There are very few farmers who pasture cows, as a rule, on much less than three acres, while it is perfectly within limits to keep a cow on less than one acre. We find that the receipts for winter dairying, after it was fairly under way, have increased the price of the product that we made, and increased the number of cows that we kept by soiling, and by the use of the silo.

We found four years ago, by the use the silo, and the practice of soiling, that we could keep eighty or ninety milch cows and some young stock, and the receipts from the sales of the dairy product were about $4,200, leaving $1,800 to $2,000 net profit after paying for the hired help and all the expenses of the farm. There was more net profit left from the winter dairy than the entire receipts were eight years ago when we were running a summer dairy. That is my experience in the change I have made

MR. LINDSAY.—What do you feed for soiling your cows in summer?

MR. SMITH.—The first green feed we cut is winter rye, sowed in August and July previous. This is headed out and fit to cut about the 20th of May, in our section of the country. We use this ten days or two weeks, until the clover is large enough to cut. That begins to blossom about the 16th or 20th of June, and then we begin to cut, and cut the clover till it gets a little old, for fresh feed. We generally have a little millet at that time. Two or three acres of millet will feed eighty or ninety cows for a week or ten days. After the millet, then the second crop of clover is large enough, and that runs till the fodder corn is in the roasting stage. Then we begin and feed fodder corn and second crop clover, whichever is most convenient and easy to manage until winter, then open the silo and feed about forty-five pounds of ensilage per day, in two feeds, giving barley or oat straw, and a little ground feed upon it—what they will eat. We milk at five o'clock the year around, and every morning we give the cows one or two pounds of hay each, not to exceed two pounds, in any case. This we give mainly that the cows may all get up ready to be milked, and that is all the hay they get during the winter. When we changed to winter dairying, there was no sudden change in the kind of cows. They were the same, when I commenced, that I had before, but I always keep a full blood Jersey at the head of the herd, and they naturally improved in quality. Therefore, they are constantly growing better for butter. The cows have improved a little in butter, and therefore, the yield is more than it would be otherwise.

MR. FAVILLE.—Are these increased receipts from your farm due entirely to changing from summer to winter dairying? Hasn't Hiram Smith's reputation something to do with it?

MR. SMITH.—I did not, in my remarks, attribute it entirely to winter dairying. I said the winter dairying, in connection with soiling cows in summer, and silo feed in winter. I think my increased receipts are entirely due to those three causes, added to what I said in regard to gradually improving the stock. My friend Faville thinks there is some necromancy about the man who sells butter—that one man can sell the butter higher than another, but my opinion is that it is not a question of reputation. My reputation for making butter might not last ten days. If I should send a poor quality of butter this week, before next week it would be all shipped back to me, and it ought to be. I can spoil my reputation in less than one week. Of course there are some people who have confidence that I will make good butter, but unless I continue to make that good butter, my reputation and my market are gone. You can't hold your market if you don't make good butter. If you do make good butter, you can get any market you go to.

MR. UTTER.—Did you use a grain ration with your rye?

MR. SMITH.—Yes, I always give a grain ration to each cow that gives milk, and generally if she don't give milk. Every day they have the value of no less than six pounds of bran or middlings, and I think it is the cheapest way to keep cows.

I wish to add that winter butter does not require any contract to sell it. I have shipped butter for the last four years, and made out the bill for two cents a pound less than I could get to send it to New York. Winter butter will always sell well. For the last four years I have shipped butter in sixty pound tubs to New York, through a commission house, and sold it in the butter market for thirty-three cents, and it cost about two cents a pound to get it there. A man with a winter dairy can take advantage of this, but if he has a summer dairy he has to do the best he can. The commission-men won't talk with him. They can't do him any good.

Another reason why this method of making butter is an improvement on the old, is that it removes all work from the house. It takes a young man to make the butter, and we hire a young man every year or two and teach him how. It is not a difficult thing to teach him to make butter. A bright young man can learn it in a week, but I would not undertake to teach a Yankee who had been in the business twenty years. It is a short job to teach it; it is governed by rules and directions which are as plain as those of any other business. It takes it out of the house into the dairy-house where it belongs, and it leaves the farmer in a much better condition, much more contented and happy, with a better opportunity to develop and find out what good there is in the world, instead of being overworked and bringing out the bad that is in him all the time.

MR. VAN DUZEN.—A gentleman wishes me to ask you, Mr. Smith, which you consider the best feed, ensilage and grain, such as you furnish your cows in the winter, or pasture?

MR. SMITH.—I think very much alike. I think good ensilage is just as good for milk and butter as the best pasture. Of course, it requires grain feed in either case. A cow cannot make good milk from one kind of feed; there is not the material in it that constitutes the proper qualities for milk; but ensilage makes the best butter in winter feed I have ever tried—nice, sweet butter, full aroma, fresh, sweet flavor that men are willing to pay a high price for.

MR. VAN DUZEN.—The great objection to soiling is the amount of labor in getting the fresh cut grass to the cow. Now, why isn't it practicable to feed this ensilage through the summer season?

MR. SMITH.—It is entirely so, and that is what we are all striving for now.

A GENTLEMAN.—In my own State, a dairyman keeps about one hundred cows, and feeds ensilage all the time, and he claims that his cows are making something like a pound of butter per day, being fed on the fresh corn.

MR. SMITH.—There are frequently changes that you cannot account for. If a person goes into business he is watching for them. We always notice an increase in the milk when we commence to feed ensilage in the fall; not so much in the butter, but quite a little in the milk. I have experimented in feeding three cows until the last of August, and the cows' product was weighed every day with that of three other cows that ran in good pasture, and the receipts are equally as good from one as the other.

QUESTION.—Wouldn't it be cheaper to feed the ensilage, then?

MR. SMITH.—It costs only about two-thirds as much to feed ensilage as pasture. The labor of cutting the soiling feed and hauling it into the barn is very light indeed. No one who has ever practiced soiling speaks of it at all, or calls it extra work as those do who never have done anything about it. A young man eighteen or twenty years' old working for fifteen dollars a month will take a team and go into the field and cut sufficient for the night's feed and the next morning's feed. He can do this after ten o'clock, and get it done by noon, and have enough to feed one hundred cows. The actual cost of that man's labor is sixty cents a day. He milks, and that is enough to earn his wages, and if it took him half a day, it would only cost the cash outlay of fifteen cents to feed one hundred cows. Do you suppose that if it were a losing business those who have been trying it eight or ten years would be pig-headed enough to stick to it? By that process they constantly increase the tillable land, and in a few years, in our State, when land is advanced to $80 or $90 an acre, it will be a disgrace to pasture tillable land.

MR. MONRAD.—I would like to ask Mr. Smith to modify his statement that any young, bright, intelligent man can learn butter-making in a week. Of course, I understand Mr. Smith, and I have no doubt that right under his own eyes a good product would always be turned out, but I think it is a great trouble in this country that so many young men come to our creameries and work a short time and think they have mastered the whole business instead of undergoing a proper term of instruction or apprenticeship as we have in Europe. I think it might do harm if that remark went out unmodified.

MR. SMITH.—I will modify it, and reduce it to five days, and to show what a bright boy can do, I will tell you that Prof. Henry was one of them. Now, do not understand that I say I can teach a boy in five days to be a perfect hand at it, and go out and have entire charge of making butter, but for all practical purposes with me, I can teach him in five days to make butter as good as milk will make. It is a simple process. You have a tank that will hold about eight cans of milk. There is a thermometer in front of the tank. You put in pounded ice and reduce it to forty-five degrees. The milk is drawn from under the cream the next morning; that cream is put away in the refrigerator in the summer, or in a room above the temperature of the living room in winter, and the next morning the process is the same. The two creamings are put together and one gallon of ripe cream ready to go into the churn is mixed in with these two creamings. They are set near a stove, where the temperature is about sixty-two degrees, warmed up to seventy degrees, and remain there four hours, churning the next morning. It will be just in the right condition. It will take but little practice with these instructions, as I have given them. I never spent in teaching a new man more than a few minutes, morning and night. About two weeks previous to the celebrated fair in Milwaukee, I hired a new butter-maker. I was busy collecting samples for the fair, but he made the butter in the greatest perfection, and I drew over two hundred dollars in premiums on that butter.

MR. MONRAD.—I am willing to accept Mr. Smith's modification, if he will supply a Hiram Smith with every new young man. I have seen some of the best butter-makers who have learned to make fine butter across the water, and my advice to them all is to go and learn to make butter with a good American creamery-man.

HOW TO MAKE BRICK CHEESE.

By T. J. FLEMING, Watertown, Wis.

Cheesing the Milk.—Brick cheese can be made by cheesing milk once a day, but the best possible results are obtained only when cheesed twice a day, or from freshly drawn milk which has not yielded up any of its cream. Bring the milk to a temperature of 90 or 94 degrees Fahrenheit by the application of heat or steam, as your contrivance permits. On a small scale, an ordinary brass kettle of the required size, placed upon the stove, but better hung by a flexible crane over the fire, the manipulations of which will enable you to accurately acquire the different temperatures required during the different stages of manufacturing, will prove sufficient for the heating and cheesing process. For operation in a factory, of course nothing short of a vat and boiler would be practical. These would cost about $125.00 (3,000 gal. vat).

Adding the Rennet.—The milk having been raised or lowered, as the case may be, to the temperature of 90 to 94 degrees, the rennet should be added. I recommend "rennet extract," as it has given me very good satisfaction. Take at the rate of a gill and a half of extract diluted in a gallon of water for 1,000 pounds of milk. Add it at the temperature of the milk, ascertained not by the finger but by a standard thermometer.

Cutting the Curd.—Stir constantly, but not vigorously, for ten minutes, and with this treatment normal milk will be sufficiently coagulated to cut in twenty minutes after adding the rennet. Insert the forefinger into the coagulated mass, raise it upward and forward, and when the curd separates clean-cut and clears the finger, it is fit for cutting, which should be done with a horizontal curd-knife. But, if you are using the small kettle previously referred to, a flat, smooth and sharp stick will serve the purpose. Pass the knife lengthwise and crosswise through the vat—slightly inclined forward—and when through permit the mass to remain undisturbed for a couple of minutes, or until the whey begins to show on the top. Then take the curd scoop, sink it to the bottom of vat or kettle, and raise it to the top of curd, at the same time drawing gently backward. So continue over the whole mass. Immediately recut as before, moving the knife more quickly.

Stirring the Curd.—It is now ready for an increase of temperature, which should begin moderately, slowly and continually increasing until it has reached 110°, which rise should consume twenty-five minutes. During this process, the curd should be constantly and thoroughly stirred with the curd-stirrer or breaker, being careful not to let it adhere or gather on the bottom, when, at the expiration of this time, or the attainment of this temperature, the heating appliance should be fully removed and the thermometer brought into frequent use. Though the heat is now through with, the constant stirring should be continued at least twenty-five minutes, or until the curd will grit under the teeth, or appear elastic between the fingers. When this condition of the curd has been attained, draw off the whey by means of the syphon, or any other contrivance suitable to your surroundings, leaving enough to just cover the curd in the bottom of the vat.

Salting.—Rub the curd and the remaining whey vigorously between the hands, until it is thoroughly disintegrated. Add a couple of double handfuls of recognized dairy salt (salt as free from lime as possible) to 1,000 pounds of milk, and mix and rub it thoroughly, that it may penetrate the whole mass.

The Press.—It is now ready for the press, which, by the way, is of the simplest construction. Take three-quarter inch pine, eight inches wide, and dress it on all surfaces; cut and nail in a rectangular shape, 10 inches long and 5 inches wide, inside measurement, with height equal to width of board when dressed. This form or mold, when constructed, will consist of two sides and two ends, being without bottom or top covering, the sides of which must each have at least six small perforations through which the whey will ooze when the necessary pressure is applied, which consists of a following cover of the same material, working loosely within the frame, and two ordinary building bricks set together and edgewise upon it. These forms are set side by side upon a clean, smooth-surfaced table, and the whole mass (as we left it when salted in the vat or kettle) is dipped into them with the curd pail, at the rate of 1,000 pounds of milk to 20 or 25 forms, governed somewhat by the richness of the milk.

These cheese when cured will weigh about 5 pounds each, more or less, it taking about 9 pounds of normal milk for one pound of cheese.

Pressing.—Immediately after putting the curd, as evenly as possible, into the forms, they should be covered and pressed at once. Let it remain not longer than five or ten minutes, then they should be removed as follows: Remove the brick from the first form nearest that end of the table toward which you are going to turn, then raise the form from you and give it a light and quick jar against the table on that edge nearest the cover. This will cause the cover, which fits loosely, to drop out; then place the form upon the table in an inverted form. Place the cover upon it, as before, and place the two bricks (now weighting the next unturned form) upon it, and so continue until the whole is gone through with. This process should continue hourly for the first three turnings, and once every four or five hours thereafter until the cheese has been in press 20 or 24 hours. In the summer months the cheese should be removed to the cellar as soon as made, the temperature of which should not exceed 65 degrees, if possible. The salt tables used generally are 35 inches wide in the clear, having a rim 8 inches high all around, to prevent the cheese from spreading and losing their proper and original shape.

Curing.— When the cheese are put into the salt table from the form, they should have salt well rubbed into them on all the surfaces, except the one upon which they rest, in a quantity not to exceed that which they will absorb in 24 hours. They should have four applications in this way, after which they should be removed to the curing room—a clean, dry, cool and well ventilated cellar. After you have gotten the cheese of four days' make into the table (using a separate table for night and morning), remove as many from the salt table to the curing room as you have fresh cheese to put in, always keeping the cross row in table full. The cheese having gone into the curing cellar, the actual and none the less laborious part of the work begins. One of the first objective points desirable is to carefully close all the pores on surface of cheese, which is usually done by rubbing them with a wet cloth in the process of washing. This should be done as quickly as possible to prevent the mold from penetrating the cheese, which is certain to be generated in the cellar, and attack the cheese where it is most easy of access. Cheese made as I have described will be about three weeks in curing, during which time they should be washed at least twice a week, and about as frequently thereafter while kept in stock, unless the cellar is very cool and exceptionally free from mold. The water used in washing should always be in the nature of brine, not so much on account of the salting effect given the cheese, as to prevent the gathering of mold. Though I have described the salting process, it is usually not sufficient, but is supplied during the process of curing by sprinkling a small quantity on the top surface of the cheese after being washed.

Boxing.—Many have inquired about the wrapping used for brick cheese. It will be seen by following the formula which I have given that there is none used. Simply, when ready for shipping, wrap them singly in cheese paper, and they are ready for boxing. Pack them on edge, end against end, two rows in the box. Place paper in the bottom of box before putting in the cheese, and another on top to prevent the flies, wind and heat from reaching the cheese.

DAIRY FARMING.

By PROF. JAS. W. ROBERTSON, Guelph, Ontario.

The Farmer's Sphere — Of occupation is to provide food and the raw material for clothing for the rest of mankind. Himself and family have the right to a first toll upon all the fruits of their labors. In filling their place and doing their work, they must call to their aid and make subservient to their ends suitable domestic animals. In the past, as farmers have provided a better class of food, advancement has been made in all the attainments of civilization. Progress in agriculture has been leading men to better lives through all the ages. While people live solely upon roots and fruits, they are on the confines of barbarism. Civilized peoples subsist upon more varied aad substantial diet. Bread without butter does not satisfy. Meat of some sort must accompany potatoes; and so through the whole bill of fare vegetable foods are supplemented by animal products. To provide these latter of the most acceptable and nutritious kinds in the most economic way is the purpose and place of dairy farming. As farmers produce an increased quantity of superior food per acre, they make it possible to support a larger population. Population is the only element which gives value to property; hence, successful dairy farming means an increase of value in all property in a country or section where it is followed.

Man's Servant, the Sun. — Many parts of plants cultivated by farmers in a rotation of crops are entirely unsuitable for direct consumption by man. By making animals consume such plants or parts of them as are indigestible by the human species, there may be obtained from the animals, appetizing and nourishing products suitable for his table. That is the true place of dairy animals in farm economy. In order that animals may be kept with advantage and consequent profit, the farmer's skill and judgment should provide plants suitable for their maintenance. The sun is the working power that elaborates soil-food, commonly called manure, into serviceable form in the shape of plants. The sun is the source of all the energy which does all the work in the world. It is the veritable working power on all the farms, though too often its value and use are unknown and neglected. Plants are contrivances of nature, whereby and wherein the sun stores up his own strength and warmth for man's service and comfort. He should be kept at work all day long. When enough suitable material for the sustenance and increase of plants by their growth is present in the soil, the sun never fails to exert his energy for the service of man. When the soil is devoid of, or deficient in, the supply of these substances, simply from the want of the raw material upon which alone it can work, the sun is kept "loafing" over the fields day after day. No farmer can afford to have the hired man "loaf" around the kitchen stove while he himself toils outside. Much less can he afford to keep the sun idling over his fields. The farmer's duty is to see that the soil of his fields contains all that is needed for the upbuilding of plants, and then, by proper management of the soil and selection of the seed, he may in fact harness the sun every morning and make it do his will. His occupation demands a brain, a judgment, a will to rule, in order that he may justify his birthright in being given dominion over the earth and its plant and animal life.

The Air—Is the source of a large per cent. of the substances that go to form the structure of plants. From it the sun is able to appropriate to the plant the very elements wherein he can best accumulate and store his strength for man's use. The corn plant is one of the best aids and means whereby this can be done. That it may be done most efficiently, corn should be planted thin where sunlight can shine and air circulate freely.

Dairy Farming Enriches Land.—Water is nature's universal vehicle for the carrying of the particles that compose the food of plants and animals to the proper places in their bodies for the sustenance of life and the increase of weight and size by the vital process of growth. The presence of too much water will hinder it from performing its peculiarly necessary tasks. Neglect of drainage will frequently leave such an excess of water around the plant roots, that they are literally drowned. The absence of sufficient water in the soil may cause the plant to starve in the midst of plenty. [The soil, besides its function for the retention of food for plants, also is the mechanical means for the holding of plants in position during their growth. Drainage and cultivation are treatments of it for the rendering of that food more easily available by plants] In carrying on his work, and in the disposal of his product, three elements of cost to himself should be reckoned and remembered by every farmer. In the sale of every article of farm product he disposes of a part of the substance and fertility of the soil. To that he gives an increased value by the application of his labor and skill. In fact, in every article he parts with, he sells a three-fold commodity, namely, substances from the farm, labor and skill. Dairy farming will enable him to market much skill without the need for impoverishing his farm by selling its enriching substances—the elements of fertility. It also offers opportunity for selling skilled labor, which brings a larger return to the salesman with less permanent exhaustion of his powers. The following table will represent the gist of this idea.

$200 *worth of*	*Substances of Plant food.*	*Labor and Skill.*
Wheat at $1 per bu.......	$48.00	$152.00
Milk at 85 cts. per 100 ℔s...	22.00	178.00
Cheese at 10 cts. per ℔....	18.00	182.00
Beef at 5½ cts. per ℔	17.00	183.00
Pork at 5½ cts. per ℔.....	13.00	187.00
Horse......................	7.00	193.00
Butter at 25 cts. per ℔.......	.25	199.75

Results of Skillful Farming.—When only ten bushels per acre of wheat are grown, the farmer receives but $152 for all the labor and expense involved in the cultivation of twenty acres of land with the harvesting and marketing of its crop. Such labor does not bring him quite thirty cents per day. If by application of skill to his work he enriches his soil, drains and cultivates his lands and selects the kind of seed best adapted to his circumstances of locality and climate, he may obtain thirty bushels of wheat per acre. In that case he will receive an equal amount, namely, $152 for labor and skill involved in the cropping of but seven acres of land. When a dairyman keeps cows that bring him $15 worth of product a year, when he sells lean steers at 30 dollars per head, when he markets hogs that weigh 200 pounds at one year old, when he sells a horse for $75, and when he takes or sends to market strong butter that is dear at fifteen cents per pound, he gets hardly thirty cents a day as remuneration for his labor. If he will put skill into the selection, breeding and feeding of his cows, steers, hogs and horses, and into the handling of their products, he may make one-fourth of the labor bring him much higher money returns. For example, there will be left for labor and skill in the feeding of three cows $178 as compared with an equal sum representing the labor for the keep of thirteen cows. So on through the list, skill alone is the element that gives the value greater than thirty cents per day. The more skill that is exercised the higher and more certain will be the satisfactory remuneration.

Cows Should Pay for Their Board.—Reference has already been made to the plant which enables the farmer to use the sun's willing power for his own benefit. To a Wisconsin audience I will not venture to speak with any attempt at instruction upon the best methods of corn culture. Canada has been learning from you in this department. But in order that the plants grown may yield the best return of which they are capable to the husbandman, his skill should be exercised to provide animals which can return to him the most in products or service for the food which they consume. It is possible to keep animals which yield so much less in food than they eat, that they are veritable burdens upon the man whose property they are. Instead of being his servants, living and laboring for him, he sometimes becomes theirs and apparently lives to keep and feed cows, hogs, and horses. The cow in all civilized countries is always a boarder upon some person. She should be made to pay for her board at such remunerative rates as will leave a profit for the boarding-house keeper. If she fails in that, she should be made to render a service which she will not willingly contribute. Her carcass should be made into beef and her hide into leather. She should not be slyly sent to board upon some other unfortunate man. A cow with the business habit of keeping her accounts with the world paid up through the man who owns and feeds her is a good business cow. That is the kind of cow I recommend. Her power of service will be indicated by certain external points. She should have a large long udder of elastic fine quality; a mellow movable skin, covered with soft silky hair; a long large barrel, hooped with flat ribs, broad and wide apart; a broad loin, spreading out into broad long hind-quarters; an open twist with rather thin hips, and a lean neck of symmetrical length, carrying a clean-cut fine face with prominent eyes. A cow with these points has ability to serve a man well, if she gets a fair chance. That her calves may have powers equal to or rather better them her own, care should be exercised in their breeding. The best blood, of the breed adapted to the farmer's purpose, should be used to enlarge and not to lessen the working capacity to be transmitted to her calves.

Feed.—The milk of cows being a direct elaboration from their blood, whatever interferes with a healthy condition of that fluid will also affect the quality and quantity of the milk secreted. Too much care cannot be exercised in providing feed suitable, succulent, easily digestible, wholesome and nutritious. The grass of early summer is too watery and weak in nutriment for its bulk, to be fed alone to the greatest advantage. A judicious allowance of bran, peas and oats, oil-cake or cotton-seed meal will increase the milk supply and fortify the cow's system for the larger production of milk during mid-summer, fall and winter. Fodder-corn, sown broadcast, does not meet the needs of milking cows. Such a fodder is mainly a device of a thoughtless farmer to fool his cows into believing that they have been fed when they have only been filled up. The same plant when grown under conditions favorable to its attainment of mature size and quality—in rows or hills 3 feet apart with from 2 to 6 seeds per foot in the row—yields a fodder by means of which cows are enabled to produce the largest amount of milk, butter or cheese per acre of the land required for their support. Fodder corn is not a complete ration for the most economical production of the best milk. When supplemented by feed rich in albuminoids, such as those already mentioned, better returns for the feed consumed are realized. Last summer one of our leading Canadian dairymen, feeding 18 cows upon fodder corn to supplement scant pasture, furnished milk to a cheese factory. In course of time he provided a supply of bran, and by the end of the first week thereafter he found by an examination of the factory books that he was credited with enough extra milk to pay for the bran consumed (2½ lbs. per cow per day), and to leave a balance of $2.43 of extra profit for that week.

Water.—Water is nature's vehicle for carrying about most of the matter which she requires to move from place place. The great boulders were quietly clasped in her arms and without apparent effort brought from the northern ridges to the southern parts of your State. The tiniest specks of nourishing matter needed to replace the worn-out tissues of the body are likewise carried to their proper places in this wonderful omnibus. The identical water swallowed by a cow to serve as a carrying medium in her blood for the equable distribution of the elements of nutrition throughout her whole body is made to serve a like function in the milk which she yields. If that water be impure in the first place, it is liable to continue so throughout its whole mission, from the drinking by the cow until after its consumption by the creature consuming the cow's product. Water which has been contaminated by decaying animal matter is especially likely to retain its impurities. The milk from cows drinking such water is a menace and danger to the public health, and interferes greatly with the commercial value of all dairy products. There should be an abundant supply of pure water, easily accessible by the cows during hot weather. It should be furnished at a comfortable temperature during the cold weather of winter. I have not found that cows which are denied access to abundance of water will give as much milk or milk of as good a quality as when plenty of water is provided with wholesome satisfying feed.

Salt.—Dairy cattle should have access to salt every day, and salt should be added to all their stable feed daily. A series of experiments has convinced me that when cows are denied salt for a period of even one week they will yield from 14½ to 17½ per cent. less milk, and that of an inferior quality. Such milk will on the average turn sour in 24 hours less time than milk drawn from the same or similar cows receiving salt, all other conditions of treatment being equal.

Shelter.—Comfortable quarters are indispensable to the health and well-being of cows. Stables during the winter should have a temperature constantly within the range of from 40° to 55° Fahr.

In summer-time a shade should be provided in the pasture fields, or adjacent thereto, to protect against the bristle-making influence of July and August suns. In all the management of cows such conditions should be provided and such care given as will insure excellent health and apparent contentment.

Milking.—When practicable, milking should be done by the same person, and with regularity as to time. He only that hath clean hands should be allowed to milk a cow. I say "he" because I think the men of the farm should do all the milking, at least during the winter months. I have exercised the right of changing my mind on that subject since I left the farm. It is no more difficult to milk with dry hands than with them wet. It is certainly more cleanly, and leaves the milk in a much more desirable condition for table use or manufacture. Pure stable atmosphere is indispensable to prevent contamination from that source. Immediate straining will remove impurities which otherwise might be dissolved to the permanent injury of the whole product.

Aeration.—After the straining is attended to, the milk should be aerated. Too often it is poured into one large can and left there just as the cows have given it. That neglect implies three things that are very injurious to its quality for cheese-making: (1) The peculiar odor which the cow imparts to the milk will be left in it until it becomes fixed in its flavor. (2) The germs of fermentation that come in the milk and from the air have the best conditions for growth and action when the milk is left undisturbed. (3) Then the milk will become almost unfit for thorough coagulation by rennet. Hence it is needful and advantageous to aerate it for three reasons: First, because by pouring, stirring, dipping or by trickling it over an exposed surface there is eliminated from the milk by evaporation any objectionable volatile element that may be in it. Secondly, because, as has already been stated, the milk contains germs of fermentation. Some of these are called vibriones. A strange peculiarity about these microbes is that they become active only in the absence of free oxygen. When warm new milk is left undisturbed carbonic gas is generated, and that furnishes the best condition for the commencement of action by these almost invisible creatures. After they get started they can keep up their decomposing work even in the presence of oxygen. It is impossible to coagulate such milk so as to yield a fine quality of keeping cheese. Coagulation by rennet of milk that is ripe can never be perfect unless it has been thoroughly aerated immediately after taken from the cow. *Neglect of aeration will increase the quantity of milk required to make a pound of fine cheese.* Thirdly, because the airing seems to give vigor to the germs of fermentation that bring about an acid condition of the milk, without producing the acid. So much is this so that *it has been found impracticable to make strictly first-class Cheddar cheese from milk that has not been aerated.*

Cooling.—The subsequent cooling of milk retards the process by which it is turned sour. Certain germs of fermentation exist in milk which in the act of multiplication split one molecule of sugar-of-milk into four molecules of lactic acid. By delaying the operation of these germs the milk is kept sweet for a long period. The cooling of milk should never precede the aeration. A temperature of from 65° to 70° Fahr. will be found cold enough for the keeping of milk over night, when it has been previously aired.

Protection.—Milk is a liquid of absorbent proclivities. It should be protected against injury that would result from exposure to impure air. A general-purpose milk-stand is a device specially adapted for the spoiling of milk in that way. Such a stand serves as a milk-stand and also a carriage stand, both of which are legitimate uses. Sometimes it is also occupied as a hog bivouac for the convenience of these animals, the end of whose whey trough furnishes one step for the stand. Both of these latter extensions of its uses and hospitalities are all wrong.

Honest Milk.—The employment of inspectors promises to improve the quality of the milk furnished by some patrons, whose highest moral aspiration is limited by an effort to keep the self-appointed commandment, "thou shalt not be found out." The adulteration of milk by the addition of water, the removal of any portion of the cream or keeping back of any part of the strippings is forbidden by statutes. Any person who is found out so doing should not escape lightly.

Matters Most Needful of Care.—In the following short paragraphs I have ventured to gather helpful advice on the matters most needful of care:

1. Milk from cows in excellent health and apparent contentment only should be used.

2. Until after the eighth milking, the milk should not be offered to a cheese factory.

3. An abundant supply of suitable, succulent, easily digestible, wholesome nutritious food should be provided.

4. Pure cold water should be allowed in quantities limited only by the cow's capacity and desire to drink.

5. A box or trough containing salt to which the cows have access every day is a requisite indespensable in the profitable keeping of cows.

6. Stagnant impure water should be prohibited. The responsibility for the efficacy of that beneficial prohibition rests wholly with the individual farmer.

7. Wild leeks and other weeds common in bush pastures give an offensive odor and flavor to the milk of animals consuming them.

8. All vessels used in the handling of milk should be thoroughly cleansed immediately after their use. Washing first in tepid or cold water, to which has been added a little soda, and subsequent scalding with boiling water, will prepare them for *airing*, that they may remain perfectly sweet.

9. Cows should be milked *with dry hands*, and only after the udders have been washed or thoroughly brushed.

10. Tin pails only should be used.

11. All milk should be properly strained *immediatety* after it is drawn.

12. Milking should be done and milk should be kept only in a place where the surrounding air is pure. Otherwise the presence of the tainting odors will not be neglected by the milk.

13. All milk should be *thoroughly aired* immediately after it has been strained. The treatment is equally beneficial to the evening's and the morning's milk.

14. In warm weather all milk should be cooled to the temperature of the atmosphere after it has been aired, but not before.

15. Milk is the better for being kept over night in small quantities, rather than in a large quantity in one vessel.

16. Milk-stands should be constructed to shade the cans or vessels containing milk from the sun, as well as to shelter them from rains.

17. Only pure, clean, honest milk should be offered. Any deviation from that will not always go unpunished.

THE ELABORATION OF MILK AND BUTTER-MAKING.

By PROF. JAS. W. ROBERTSON, Guelph, Ontario.

All milk, like some butter, is fearfully and wonderfully made. With reference to the elaboration of milk I mean all that the sentence expresses; and, as a people earnestly progressive in the search after further information concerning dairy husbandry, I find the people of Wisconsin earnestly anxious to learn. While I admire the progressive earnestness of your people, I have no words of commendation for that quality of butter which can be shortly defined as "progressive." It goes on from strength to strength continuously.

Milk Elaboration.—Milk is secreted by and in two longitudinal glands, commonly called the udder. These two are separated by a fibrous partition, which is attached to connective tissue under the skin. That tissue also spreads through the udder, apparently for its support in position. The udder is spoken of as having four quarters. That is popularly correct, although the division between the two quarters on each side is not definite or distinct. The gland stripped of its covering, is a reddish grey substance. In dry cows the deposit of fat in the connective tissue gives it a yellowish appearance.

The internal canal of each teat opens into a milk cistern. The total quantity of milk held in the four cisterns or reservoirs at the top of the teats will seldom exceed one quart. Numerous ducts arise from these and branch into all parts of the udder. The ducts and their branches become smaller as they spread, until each one ends in a vesicle, or "ultimate follicle," about one-thirtieth of an inch in diameter. Into these cavities, the serum of the milk—its water, casein, sugar, albumen, etc.—seems to pass from the arterial blood through capillary tissue. A change in the cell albumen of the blood is believed to take place during that transition. The inside of each vesicle is studded with innumerable cells. Through these the fat is produced, supposedly by budding. There are ordinarily over 1,000,000,000 of these globules in a cubic inch of milk. They have no organic pellicles or so-called skins. The activity of secretion depends largely upon the vigor of the blood circulation. The production of fat depends mainly upon the temperament of the cow, gentle handling, and feed rich in protein. Violent disturbance of her nervous system has a disastrous effect upon the cell action and capillary activity in most cases. Arteries, veins and nerves together pervade the whole of the udder structure. New ducts are formed by sprouting or spreading out from the others. Rubbing of the udder, rapid and clean milking will promote their growth and development until the sixth year of the cow's age. A pressure of fat in the connective tissue on the gland interferes with and hinders the secretion of milk.

Separation.—It is practicable to separate cream from milk, only because the fat globules which should mainly compose the cream, are lighter than the serum of the milk in which they float. The means for separation may be spoken of as natural and mechanical. In both cases the globules are made to travel in a direction opposite to that of the force which is exerted upon the serum or heavier portion of the milk, which is a solution. The fat globules are in the form of an emulsion in that solution. The setting requirements are a falling temperature of from 90 to 40 degrees Fahr. When milk has become colder than 90 degrees before it is set, the rate of separation is proportionately slow in all milk, except that wherein the fat globules are extra large. To raise the temperature to the required point, water as high as 125 degrees may be added to the milk. Such an addition of water will also reduce the viscosity of the serum, and thus permit the fat globules to have an easier passage through it to the top. Prof. Babcock has done the dairy world admirable service by his researches into the contitution and physical nature of milk. Wisconsin has acquired world-wide fame, more through the work and triumphs of some of her citizens in dairy matters than by all other achievements of her people, which erstwhile had alone been acounted worthy of public mention. When the milk is set, all disturbance tends to retard the separation of the cream.

Cream.—Cream is merely that part of the milk into which a large proportion of its fat globules should have been collected. They have not been collected into the average cream of hotel tables. Occasionally in butter-making difficulty is experienced in effecting separation between the globules of fat and the serum of the cream, which is the whole endeavor and aim of the operation of churning. To make that easier, about 25 per cent. of pure water may be stirred into the cream while it is still sweet. Thereafter the cream should be ripened by souring before the churning is commenced. Taking a quantity of cream containing 100 pounds of butter fat, it is possible by proper souring to recover 97 pounds; while, if an equal quantity of cream of equal quality were churned sweet, not more than 77 pounds of the fat would be recovered in the butter. While the cream is ripening under ordinary conditions, frequent stirring will prevent the formation of any thickened part on the top which is apt to result in leaving white specks in the butter. If uniformity can be secured without stirring, it may be omitted, but not otherwise.

Churning.— The range of churning temperature for ordinary practice is from 57 to 64 degrees. For some time after the milking season of a cow begins, the fat globules are of a softer quality than they become some months after parturition; hence, during that period and in the early summer, the churning can best be performed at from 57 to 60 degrees. Later in the season, and in the other case as to length of time after the calving of the cows, it may vary between 60 and 64. No one can afford to try to make butter without the possession and proper use of a reliable thermometer. The churning, by which the globules of fat are impacted into each other, should not be continued after the particles of butter are half as large as wheat grains. It is usually preferable to stop when they are smaller. A small quantity of water should be added; and the churn revolved a few times before any attempt is made to withdraw the buttermilk. Then, after the removal of the buttermilk, water should be added at a temperature of about 55 degrees. The washing will thus be effected in the granular state; and all subsequent rubbing and working for the expression of the buttermilk may be avoided. The working of the butter should be effected by pressing and not by rubbing. The temperature should be from 55 to 60 degrees. The movement of the butter is after all less likely to make it greasy or to destroy its grain than its working at an unsuitable temperature. Salt should be added to suit the demands of the market to be supplied. For immediate consumption, half an ounce per pound of butter, will give a mild flavor very acceptable to most eaters. One ounce of salt per pound will preserve the butter for a longer period; but not much more than half an ounce of salt is retained in the butter in a dissolved state. The reworking of butter is of some service in removing any speckiness and also in increasing the waxy quality of the butter's texture. In preparation for the market, the rolls, prints or packages, should all have a neat, attractive appearance. The less crimping, or attempt at such ornamentation, the better will be the taste of the butter and the taste of the maker.

Conclusion.—In conclusion, the winter season is certainly the time of the year for butter-making in the northern part of the American continent. Our adaptation is for cheese-making during the summer and for butter-making through the winter. By such means stock-raising is encouraged instead of hindered; and the highest market price is realized when the production is greatest. By making butter upon the co-operative plan, six times less capital will be required for machinery equipment, and six times less labor for the manufacture and marketing of the product. In butter-making, he who makes good butter does a good thing, for fine butter is practically the materialization of sunbeams for the comfort and sustenance of man.

FEEDING HOGS TO PRODUCE BEST RESULTS

By THEO. LOUIS, Dunn County, Wis.

On the subject of food supply for swine there exists much difference of opinion. I can only give my own views from a practical standpoint, as a farmer.

Feeding for Fat.—The prime object in feeding swine is often to accumulate fat as rapidly as possible on those intended for market. Too often this proves a failure, when in the bill of fare clover and pasture are omitted. To keep stock hogs in healthy growing condition, and to have brood sows in the best condition for bearing and suckling their young, the stomach must be kept healthy and not overloaded; the food must be in variety and in suitable quantities. The hog cannot thrive on an exclusive corn diet and mature, and green clover as an exclusive diet is as far wrong as dry corn. To feed sour slop, for instance, with clover would be another error. Clover contains acid enough in itself. If we could have roots, at that time of the year, such as beets, rutabagas, or mangolds, which contain large quantities of soda salts, it would prevent an undue acid condition of the stomach; therefore, we have found that a feed of corn with clover gives a better balanced ration. Let all grain rations in whatever form they are fed while swine are on clover be sweet, for the best results.

Soiling With Clover.— The advisability of soiling hogs with clover has been advocated. I admit, that when in the fattening process a daily ration of cut clover is given, especially when corn meal is used, there is advantage gained in receiving greater returns from food consumed. Great profits may be derived from soiling, and one may be able to feed at least 14 head of hogs to the acre, as I know from actual test in soiling several score each season; but with comparatively cheap lands, and high prices for labor, the question as to profit remains doubtful as yet. Another consideration: There would be a lack of exercise for the development of the young and growing animals, and if permitted to run in a large and roomy yard, the losses of manure would largely offset the profits. I do not as yet find any other method superior to the division of fields with moveable fences, so as to have new, fresh fields alternately during the season. I have found, also, that a mixture of grasses is preferred by the swine. They love a change and variety. The feeding value of clover has been estimated all the way from 600 to 1,000 pounds of pork per acre; my experience leads me to conclude that the former is nearest correct.

Pigs Good Grassers.— It is often disputed that pigs, when nursing the dam, and liberally fed night and morning, eat much clover. I have found that they are not only good grassers, but that they make larger growth and are more vigorous than when reared on grain alone. The storing system is largely practiced in our State, to keep pigs and shotes during winter. Prof. E. W. Stuart says that if pigs were like a wagon, a bin of grain, or a mow of hay, they might be kept without expense over winter; but when we reflect that two-thirds of a full ration is used merely as food of support without adding any weight or value to the pig, the practice is indefensible.

Clover Hay for Hogs.—Clover hay, especially that from the second cut, if stacked in a sunny and sheltered place, and care is taken that around the bottom of the stack the ground is kept clear of snow and the coarser refuse, will be found a great aid to the man who adheres closely to the proverb, "root hog or die;" but for the intelligent, thinking farmer, there is a still wider field of profit. By cutting, and moistening the hay with either steam or hot water, all will be eaten with considerable relish, giving growth and health to the pigs, and fitting them for successful, rapid fattening animals, either for spring or summer market. I have found it better not to cook or steam clover hay, as it becomes tasteless, and pigs largely refuse it, and also that shorts mixed with clover are not so readily eaten as cornmeal, the former containing nearer the same food relation to clover. The pig is a good chemist, if you give him a chance. If clover hay is either cooked or steamed, unless the entire quantity is cut fine or short and mixed with sufficient grain to absorb the water, it will be better to use only the so-called hay tea, which is of a strong and pleasant odor. I have found it an excellent substitute for water to prepare swill for farrowing sows.

Clover Ensilage.— Last, but not least, comes the clover silo. It has been conclusively proved, during the last season, that the silo has been a greater success in preserving clover in a sweeter condition than corn. It now only needs perseverence and intelligent application, to show to what extent we can use clover ensilage as food for hogs. Undoubtedly our dairymen will give it their attention another year, for surely their discussions on corn ensilage this winter lead me to think that it is not often a balanced and succulent ration. I fear, from a breeder's standpoint, that the result from an all corn ration may become disastrous to them in time.

Feed Judiciously.—I am in favor of the clover field and a clover ration, but safe and judicious feeding must go hand-in-hand with them, and I feel that I am far from the true problem of cheap and profitable food rations. The ever increasing fertility of our soils produces more, cheapens our rations to meet the ever increasing competition of cheaper meat products, and adulterated lard.

Value of Experiments.—It is fortunate for our State, and the agricultural interest, that our experiment station has come so bravely to our aid. Prof. Henry, assisted by an able corps of assistants, has advanced some ideas that are often contrary to the experience of most of us, but he has figures to substantiate his assertions. Every intelligent citizen recognizes the supreme importance of our agricultural interest, and that its development imperatively demands that accurate experiment be made for the settling of mere opinions, and for the development of new truths.

In conclusion let me say, with F. D. Coburn: Pasture — let this word be written in capitals by every man who raises swine; it is the secret of success. Permit me to add clover.

THE SCIENCE OF PIG FEEDING.

By GEO. McKERROW, Sussex, Wis.

Cost of Producing Pork.—Sir J. B. Lawes, of Rothamsted, Eng., found by experiment that cattle utilized 8 per cent. of the dry substance of their food, the sheep 12 per cent., and the hog 20 per cent.; but as the hog's food is of a more concentrated, valuable kind than that of cattle or sheep, we do not claim that his meat is produced at less than half the cost of beef, or at nearly half the cost of mutton. But we do claim that the hog, when properly handled, is among the most economical machines for changing coarse grains, grasses, and roots, into a valuable meat product. Now, the question arises, how can we profitably feed this animal so as to meet the stringency of the times and the demands of the markets.

To Secure Early Maturity.—Fellow farmers, this is an age of early maturity. It has been clearly demonstrated that it is the young animal that gives the best results in increased weight for the food consumed. To secure this early maturity requires careful thought and good judgment, which every feeder should exercise to the best of his ability. He should study carefully the food, care and comfort, of the animal, so that a high, muscular condition may be developed, which will insure health and vigorous digestion, both of which are necessary to profit.

Ration for Young Pigs. — Whole milk, nature's most perfect food for the growth and healthy development of young animals, should be our food standard for them while young, and the more approximate to new milk we can make our ration for the young pigs the better will be the results. This ration must be so formed as to be rich in muscle-froming or nitrogenous elements, and, as Prof. Henry demonstrated, in his much quoted experiment of 1885, that the bone and muscle of the hogs fed on a muscle-forming or protein ration were on an average nearly 50 per cent. stronger and larger than those fed on fat and heat producing foods, rich in carbohydrates, and that those very important organs, the liver and kidneys, were much larger in the protein fed hogs, we must conclude that for the sake of health and vigor we need such muscle-forming rations.

Folly to Stick to Corn Alone.—To stick to corn, and corn alone, in the face of these facts, is the height of folly. Our experience has taught us that an entire corn ration soon damages the organs of digestion; and the main secret of good feeding is to get the animal, when intended for the market, to eat and assimilate all the food possible. This can only be done by feeding a proper amount of a balanced ration, for if we feed too much carbohydrates we not only lose a part of the food but overload the organs with useless work, and the same is true of too much albuminoids.

A Good Ration for Young Pigs — As a food for young pigs, we have found a mixed ration of 50 per cent. middlings, 25 per cent. corn meal, 15 per cent. bran and 10 per cent. oil-meal, wet up to a creamy consistency, and fed three times daily in such quantities as they will eat up clean, and at the same time appear to be satisfied, gives us the best results. In addition to this, a few whole oats on a clean plank floor and a few roots in their season make valuable adjuncts. As they grow older, we increase the corn meal until, at 5 to 9 months old, 50 per cent. corn, 25 per cent. middlings, 15 per cent. bran and 10 per cent. oil-meal form their rations.

Pasture for Hogs.—Believing that the hog's stomach needs a fibrous food, as a divisor we aim to give them pasture in summer, and some hay and roots in winter. You may question the profit in using some of these foods, and ask, why do you feed bran, clover and clover hay? I answer because, first, they act as a divisor for the more concentrated foods, and allow the gastric juices a better chance of permeating the whole mass, and, second, they are all nitrogenous foods; and, again, you may ask, why buy costly oil-meal?—to which I will answer, first, it has a highly stimulating effect on the digestive organs and the whole system, without any reaction; second, it is one of the best nitrogenous foods that we can use. When hogs are well grown, from seven to ten months of age, they will stand heavy corn feed for one or two months, and lay on weight quite rapidly, but even then they will do better with a good supply of clover or roots.

Ashes—Charcoal—Salt—Sulphur.—We have found wood ashes, charcoal, salt and sulphur, as well as coal slack, to be relished by our hogs, and therefore believe them to be good, when carefully fed, as appetizers and assistants of digestion.

Skim-Milk. — Skim-milk, which is too rich in albuminoids, should be balanced with corn-meal. Prof. Stewart recommends 1 lb. corn-meal to 2 lbs. of milk, while Prof. Henry 1 lb. corn-meal to from 1 to 1½ lbs. of milk. In one of Prof. Henry's experiments, of 1887, where he fed 1 lb. of corn-meal to 1.1 lbs. of milk to 37 pigs, I have figured out that his pork cost him $2.82 per cwt., allowing milk to be worth 25 cts. and corn-meal 75 cts. per cwt.

Sweet Whey.—Sweet whey, which is rich in carbohydrates, or heat and fat-formers, should be balanced with a mixture of 50 per cent. middlings, 40 per cent. bran and 10 per cent. oil-meal. Mixing this with whey at the rate of 1 lb. of meal to 5 lbs. of whey, will give fairly good results, but if your whey is sour you had better mix the meal with water. We once fed a lot of shotes on a mixed ration, buying all the feed consumed, when the price of feed was higher than at present, and produced pork at 3¼ cts. per lb.

Comfort.—The comfort of the animal has much to do with his development, and to be comfortable he must have clean, dry, moderately warm, well ventilated quarters to rest and sleep in. To have this comfort, it is not necessary to have an expensive hog-house. In fact, most of these expensive hog-houses are acknowledged by their owners to be a sad disappointment.

A number of small, moveable houses suit our ideas best, for several reasons, among which are, first, cost; second, they can be moved to the pasture in the summer, and when the soil of one yard becomes foul from use they can easily be moved to another; third, in case of contagious diseases there are not so many under one roof.

There are many plans for these small houses, all of which have their advantages and disadvantages. The one we use is made eight feet square on the bottom, with roof slanting from the outside of floor on each side to peak, rear and front boarded up, with door in the center of front. This pen costs less than $5 when completed, can be moved anywhere on a stone-boat and will accommodate anything, from a brood sow and litter to 6 or 8 shotes. We use common 16 feet boards, cut in two, for both floor and roof, and four two by four scantlings, eight feet long, for sills. A window above the door to let the sun's rays in to warm up pigs and bedding is also essential.

We also have a small moveable yard, 6 by 6 feet, 3½ feet high, boarded up on three sides, with floor, that can be placed in front of these houses when we wish to confine the occupants.

Exercise.—Exercise is necessary to promote the health of the growing animal; therefore we prefer to give the pigs the liberty of a yard or pasture, and induce them to work by scattering a few oats or shelled corn on some hard spot of ground or plank floor.

Breeding Stock.—In the rearing of breeding stock, I would not force them quite as much as those intended for the market, but would endeavor to keep them rapidly growing, not allowing them to become stunted, for once allowed to contract the unthrifty habit, no matter how well fed and cared for afterward, they never will get back to their original habits of assimilating food, and thereby turning it to the best advantage.

Health.—The health of the animal requires all these precautions in feeding. Why is it that the swine plague has never appeared in Canada, where no corn, comparatively speaking, is fed, but such foods as oats, peas, bran and middlings make up the ration? My friends, if properly fed and cared for, the American hog can produce Irish bacon good enough for the epicures of Europe, and he will be muscular and healthy enough to again enter the ports of Germany, although he may have to carry Bismark out of the way on his broad muscular back.

CARE OF BROOD SOWS AND YOUNG PIGS.

By GEO. WYLIE, Leeds, Wis.

Points of the Brood Sow.— The first consideration should be that the animal is worthy of the best kind of care. In selecting my brood sow I want a good, frank, open, intelligent countenance. Did you ever see a hog with that kind of a face? If not, the sooner you begin to look for it the better; that is if you are in the hog business. I want constitution, substance, vitality, good, hard, flinty bone, and plenty of it. Proper discrimination must be made between this quality of bone and bone that is coarse or soft and spongy. The general outline of the animal must suggest ranginess and plenty of room. I want limbs of medium length, strong foot and pastern, length, breadth and depth of body; a well sprung rib, a full deep flank. She must be naturally a good feeder, with strong powers of assimilation. I don't care how large she is, provided she is symmetrical in form, and does not show coarseness. I will not object to this kind of an animal, though her ear may be a trifle "off" from the standard. She may even have a well defined "swirl" in her back, or be lacking a little in the regulation markings. In passing, let me say that this class of swine can't be produced on a diet of corn. Such animals are the result of long-continued selection from animals that have been properly bred, fed and cared for for many generations.

Selecting the Brood Sow.— The prospective brood sow should be selected generally before attaining the age of four months. She should be allowed to run with the rest of the herd as long as the feed is made up of bone and muscle-forming constituents. When the finishing process begins on the rest of the herd, and the feed is carbonaceous in its character, your brood sow should be kept apart from those intended for market.

Feeding. — To crowd pigs intended for breeders on fattening foods as you do those intended for pork is simply ruinous. When the assimilating powers of the growing pig are taxed to the utmost on fat-forming food, the breeding qualities, the vitality and future usefulness of the animal are sure to be impaired. A growing pig will seldom get too fat for breeding purposes if properly fed on bone and muscle-forming food, even if fed all it can eat, provided it can run around and take plenty of exercise. It is after it has attained its growth that injury may be done by overfeeding or by keeping it in too narrow limits while growing. Skim-milk, shorts, oats, grass and exercise, with a very limited amount of corn, are among the principal requisities for the successful growth of a young brood sow.

Age for Breeding.—No brood sow is at her best as a brood sow until she is two years old, or over. When fully matured, they give more milk, have a greater capacity for assimilating food and, as a consequence, their pigs are stronger, healthier and grow faster.

Good Milkers.—We must insist on

breeding only from sows that have proved themselves good milkers, or that are descended from good milking strains. These milking strains in swine are just as pronounced as milking strains in Jerseys and Holsteins.

One Litter a Year.—In summer, after the pigs have ceased running with their dam, let her have a run on grass with very little grain. Don't fatten her up, but let the system get rested preparatory to raising another litter. One litter per year is all she should raise, if you want to keep up the vitality of the stock.

In Winter Quarters.—We prefer to have mature sows go into winter quarters in rather thin flesh, but still in good heart; and then, during gestation, keep them gradually gaining up to farrowing time, which, in this latitude, should not be much before the middle of April. During the winter they should not be crowded for room; not even four or five mature sows should be allowed to sleep in one apartment. Those of like size and disposition should be kept together. Some sows as they grow old acquire an over-bearing disposition, and make life hardly endurable to the rest of the herd. If such animals are too valuable to dispose of, they should be kept by themselves.

Feed During Gestation.—During gestation the feed should be of a bone and muscle-forming character. I have found oats, shorts and corn, in equal parts, with roots enough to keep the system cool, free access to charcoal, wood ashes, and salt. with an occassional lump of hard lime morter, and plenty of exercise, to give as good satisfaction as any combination I have ever tried.

The Farrowing Pen—For a mature sow should be not less than 8×10 feet in size. It should have a tight floor, with a fender placed around the sides. Pens should have plenty of sunlight, good ventilation, and clean dry surroundings generally. Very little bedding should be given, and that preferably of cut straw or chaff. Damp bedding, or dampness of any kind, is very injurious to young pigs, and should be guarded against. Brood sows thrive better and are really more valuable if you make pets of them. When you find one disposed to cultivate your acquaintance, always notice her — the chances are that she is a good one.

Treatment at Farrowing Time.—In regard to the treatment at farrowing time, opinions differ. We formerly placed our brood sows in pens by themselves a week or two previous to farrowing; but for a number of years past we do not give them a pen apart from the rest of the herd until from 6 to 24 hours before farrowing. In separating a sow for a week or two, there is a tendency to restlessness. She is anxious for the companionship of her mates, is usually deprived of her accustomed exercise by being confined in smaller quarters, and the general result is feverishness of the system, which is just the condition of things, above all others, that should be avoided. If she is quietly separated when she instinctively desires to be alone, all danger from feverishness will be prevented.

After Farrowing—Give her nothing until she appears hungry, and then only a light feed of thin, warm slop, made by stirring a handful or two of shorts or bran into less than half a pailful of water. Do not enourage her to eat. A few roots and free access to charcoal will have a cooling effect on the system, the condition of which should be carefully watched for the first few days. Be in no hurry to crowd her with feed, as for the first week or two the pigs require very little for their nourishment. Exercise and sunshine at this age is of the first importance. When they are four or five days old, they should be out-of-doors with their dams every pleasant day. They should not be let out in the morning until the dew is off the grass, and should be returned to the pens early at night. A little fresh earth is conducive to health in the young pig. In this respect he differs materially from a certain other animal that nothing short of "the *whole* earth" will satisfy.

FEEDING SWINE FOR MARKET.

By THOS. CONVEY, Ridgeway, Wis.

Give the Pig a Good Start.—Few feeders recognize the necessity of giving the young pig a good start. If through want of judgment, or want of care in changing it from the milk of the sow to other food, liquid or solid, it suffers from impaired digestion or defective nutrition, it may get a set-back from which it will never fully recover.

Food of Support and Production—The principal part of our hog crop is marketed when they are about eighteen months old. The average weight at that age could be easily attained by a pig nine months old, the amount of food consumed by the former being nearly twice as much as that eaten by the latter, the younger pig receiving more during the early, and the older requiring more during the latter part of its existence. A certain amount of food is required to keep an animal in its present condition. This is termed the food of support. All food given in excess of the food of support is termed the food of production, and in feeding should go to increase the weight. The food of support constitutes about seven-tenths of a full ration, but the food of support for a restless, irritable hog may very nearly approach the food of production for a well-bred, well-fed hog, the cravings of the appetite of the former causing him to take a needless amount of exercise, and all muscular exercise is at the expense of food. The poor hog also becomes the prey of internal parasites, when placed upon full feed, as he must be, to prepare him for market. He over-eats, there is over-distention of the stomach, causing comparative inaction of that organ, and he can only digest and assimilate a portion of the food he consumes.

Points in Favor of Early Maturity.—The younger hog is converted into a more edible product, commands a better price, is generally ready for a better market, gives quicker returns and requires less attendance. He can be fed when on pasture, the droppings are not wasted, and food is not expended in keeping up animal heat during the entire winter.

About the only argument that can be made in favor of keeping the older hog is because our daddies did it. Profitable hog-feeding for market is not possible after the first year. You not only have to provide for additional growth, but also for organic waste in the growth already secured, as mutability is one of the inexorable laws of nature. This waste is presumable greater in a large animal than in a small one.

Feeding to Produce Gain.—Repeated experiments have demonstrated, beyond a doubt, that the most profitable feeding is during the early period of an animal's existence. This is especially true of the hog. The modern hog, with liberal feeding, will reach maturity in about two years.

Prof. Sanborn, of Missouri, in more than one hundred feeding tests, determined that to make a certain amount of gain, pigs weighing 220 ℔s. required 18 per cent. more food; pigs weighing 270 ℔s. required 50 per cent. more food, and pigs weighing 325 ℔s. required 78 per cent. more food than pigs weighing 70 pounds.

Prof. Hunt, of Illinois, determined, by actual experiment, "that the gain for the amount of food consumed decreased during fattening." Also, "that an insufficient food supply for two weeks caused a very considerable loss in feeding thereafter."

Feed Young Animals.—Chemistry informs us that the younger animal utilizes more of the elements contained in the food than the older animal does.

Prof. Henry says of feeding cattle: "You cannot be too careful about putting your feed and money into young cattle, and avoiding old ones." This is more applicable to hogs than cattle, as the hog reaches maturity in about one-half the time cattle do.

The Right Kind of Food.—Another essential of successful hog-feeding is to give the right kind of food. All the substances that enter into the make-up of an animal are derived from its food. No single article of food is capable of supporting a healthy hog, except for a limited period. Grass, especially clover, is one of the best of hog foods, but is too bulky for the stomach of a hog to produce the best results. It should always be supplemented with grain. One bushel of corn fed to a hog when it has access to a good clover pasture, will produce more growth than three bushels when corn is fed exclusively. All foods consist of certain elements. All farm animals consist of about the same combination of food elements. The right combination of nutrients to promote the most successful growth of an animal is not found in a single article of food. The different articles of food are generally divided into two classes: First. Protein foods, also termed flesh-formers. Second. Carbohydrates, also termed fat-formers. Clover, oats, peas, beans, bran, shorts, skim-milk and butter-milk belong to the first class, as they are rich in bone and muscle-forming elements. Corn, barley, whey, roots and acorns belong to the second class, as they are rich in heat and fat-producing elements.

What and How to Feed.—Corn should never be fed as an exclusive ration except at the close of the fattening period, and then only for a limited time. Whey should always be fed sweet, as the small amount of solids it contains consists mainly of sugar of milk. In souring, the milk sugar is converted into an acid, and has little or no value as a food. Whey should always be supplemented by a nitrogenous food. Buttermilk has twice the value of whey as a food. It should be fed as fresh as possible, and can be very profitably fed with corn. Skim-milk should always be fed sweet. Sour feed of any kind is of questionable value; a slight degree of acidity may not be injurious in some kinds of food, but this does not apply to feeding skim-milk and whey.

Give a Protein Ration.—Pigs usually receive a ration too rich in carbohydrates and deficient in protein. The necessity of giving a nitrogenous or protein food cannot be overestimated, especially to young pigs, as they require twice as much nitrogen as old hogs; yet feeding for health or profit is not subserved by feeding protein foods alone, as they are constipating, and, except clover, costly. An experiment has demonstrated that one bushel of corn will make as much pork as three bushels of oats; yet good oats are an excellent hog-food, being rich in nitrogen, and the ash that is necessary for the formation of bone.

Give a Balanced Ration.—The advantages of giving a properly balanced ration, suited to the age of the pig are: You secure greater growth with a given amount of food. You also obtain a better quality of meat. There is a more perfect growth of bone, and greater muscular development, both being promoted by a moderate amount of exercise. A high degree of muscularity indicates a condition of the system the least liable to disease, also the most perfect condition for breeding animals. Prof Henry says that pigs should not be confined to close quarters for more than sixty days. This is certainly long enough.

Cooking Food.—While I am satisfied that the tests carried on by our experiment station prove that giving hogs cooked food exclusively does not pay, yet I believe, for fall feeding, where hogs are taken off the pasture, it is very advantageous to feed once a day on cooked food. For this purpose, roots, cooked about the same as for table use, should be mixed with ground oats, rye or other nitrogenous food. Sugar beets are very valuable for fall feeding, but turnips, raw or cooked, are better for winter feeding, as they are better keepers.

Peas and Oats.—Peas and oats sown together are a very valuable crop. They can be sown at the rate of one bushel of peas, and one and one-half bushels of oats per acre. This crop can be cut with the binder, and threshed as readily as oats alone. Care should be taken not to sow on ground where oats lodge. They should be sown early. I raised last year forty bushels per acre, weighing 44 lbs. per bushel. When ground, they are a good substitute for bran and shorts, but may be fed whole to hogs. The object of improved agriculture is to obtain the largest amount of nutritious and life-sustaining substances from the smallest possible space. This, to a considerable extent, is secured by retaining and increasing the fertility of the soil, and by skilful feeding; but the customary way of hog feeding is as great a robber of fertility as the much condemned wheat raising. Grain and milk are largely fed to hogs in pens without regard to saving manure, for it is leached out and washed away, and only a small portion of the least valuable part returned to the soil. Added to this is the loss occasioned by washing away of the surface soil in corn-fields, where the land is rolling, this being augmented by not observing a suitable rotation with grass.

Skillful vs. Poor Farming.—The person who causes two blades of grass to grow where only one grew before is regarded as a public benefactor. Too many of us not only fail to produce the two blades of grass, but, on the contrary, expend two blades, or its equivalent, to secure results that the skillful feeder, with a well-bred animal, can obtain with one. Is it any wonder that the good farmer can make money every season, while the poor one is complaining of weather, crops and prices?

Valuable Experience with Hogs.

[*Discussion of Preceding Papers.*]

PROF. HENRY. — Two years ago we took pigs of the same litter and fed one lot in one way, and the other in another way, exact rations, and have followed out the experiments later in such a manner that we know we can do the same thing again and produce the same results. Chas. W. Garfield, of Michigan, said: "That is very nice work, but I don't believe you can do it again." We have done it again and again. Last summer we killed pigs at the farm where one lot had been fed upon these carbohydrate feeds, and another lot on protein feeds. We found that there was a difference in the solid matter of the blood—there was twenty-five per cent. more dry matter in the blood of one lot of pigs than in that of the other; we found that the bones were stronger, that there was an actual difference in the strength of the bone. We have gone over the work in another direction since last summer. I am now trying the effect of feed upon bones, to see if by feeding ashes we can get strength into the bones, feeding wood ashes with corn.

I heard a farmer say the other day, at a meeting: "If my pigs get too fine bones I send off and get a large boned sire, and in that way I keep up the strength of my pigs." Suppose the Arabian horse-breeder should send out of Arabia to get a large-boned horse to keep up his herd of horses! When you have to send off your farm to get other stock, except for the purpose of changing, your system of farming is wrong in some way. If the bones of your pigs become smaller, there is something wrong. Your soil is against you, your feed is against you. If a country cannot make people grow up to their normal stature, and be strong and vigorous, there is something wrong with the soil and the climate. I say when the American farmers are feeding any line of stock so that that stock is degenerating in size or in constitution, they should stop and say: "What is wrong?"

Another point. I meet a farmer and he says: "I get twenty-five cents a pound the year around for my butter. I don't sell my butter at the corner grocery; I have customers, a picked trade. They are people who eat good things in this world, and pay me for my butter." That is very well; but, my friend, where do you sell your hogs? "Oh, I sell my hogs to the hog buyer, drive them in a wagon and they go in the cars with Tom, Dick and Harry's hogs, and they go to Chicago and are sold." Now, the cases are not entirely parallel, but in a degree they are, and people living as near to good commercial cities as you do here, ought to think of this thing. Here is Milwaukee with a couple of hundred thousand people, and Chicago with some eight hundred thousand. There are people in Milwaukee and Chicago who pay high prices for all the pork they eat. The bacon that supplies many of the wealthy people of Chicago comes from Ireland. They are not Irishmen; they don't care to help Ireland out, but they say: "The bacon is better flavored," and they don't care if it costs several times as much as it would here. There has a large trade sprung up at one of the stores in that city for that kind of bacon. Some people will buy high priced things because they are high priced. We have "got onto" this idea in butter, and make it for that kind of a market, but we have never thought about it in pork.

There was a college boy years ago who went out and took his father's farm in Massachusetts, and the first year he carefully cured the meat from eight hogs. He sold or gave away that meat to his friends in Boston. The next year they came back, and said: "We want some more of that sausage," and that year he put up thirty hogs. Now he puts up over three hundred hogs a year, and last January, when I was at the Reade Hotel in Chattanooga, Tennessee, I had the pleasure of ordering from the bill of fare sausage from that farm in Massachusetts. Now, why should Massachusetts hogs have to go down to Tennessee to be eaten? Why should we allow the trade to come in that direction? At one of the institutes we stopped at a hotel at Mazomanie, and a farmer came in with his sausage to sell. Three or four workers gathered around him, and the hotel man told us how the farmer made the sausage, and brought it in to sell, and we bought some and took it home in our grip-sacks. The landlord says that man was once poor and in debt for his farm. He began to peddle sausage, has now a large trade, his sausage is known all over the country, and people are glad to pay a little extra for it. This is just a hint which I think is worth following up. We might just as well shut out this Irish bacon, and have these people pay us two prices for this product as not to get it.

My friends, I hope you will think of these matters. Every time one of us steps out of the ordinary, we leave a little more room for the crowd that is left behind. We will get a little more and the crowd will be better off.

MR. SHERWOOD.—Do you suppose that I could get one-tenth of a cent more for a hog raised on the more approved plan than I could for a hog raised in the ordinary way?

PROF. HENRY.—Probably not at first; but if you had taken your butter to the corner grocery without striking out in any other direction you would still be getting corner grocery prices. The hog buyer won't give you any more, but there is somebody in Chicago who will. Somebody will pay you a special price for lean-meat sausage, another for fat sausage that he knows is carefully made. Of course, it will cost something to find the customer, but that is true in the butter trade or any other kind of business.

MR. LOUIS.—On that point I want to say that last winter Mr. John Plankinton, after he had shown me through his slaughter-house and packing-house, said to me: "Mr. Louis, if the farmers of the State of Wisconsin, or any set of farmers, will give me the assurance that they will find us a few car-loads of hogs that are fed to lean and fat, we will give a large money premium, and will advance the price of the pork on such a product. That shows that there would be a market for specially bred and fed hogs. It is very easy to raise that kind of pork for the market, and it is just as cheap to raise it for the market as it is the fat pork.

It merely exists in the brain of a man that he makes cheaper pork out of corn alone. I am feeding a lot this winter a right balanced ration, which will give me a lean and fat hog. In fact, I have put forty-eight hogs on the market in Eau Claire to one of our packing houses, which were deemed the finest hogs that ever entered upon the block in Eau Claire. They were just fed on clover and corn. At the same time in the fattening process their swill consisted merely of shorts alone, and I find that these hogs are very far superior; they contain a greater proportion of lean meat. That was at least the judgment of the packer.

QUESTION.—Did you get any more for them?

MR. LOUIS.—Yes, I was paid nearly three-quarters of a cent more a pound than the general market was giving then.

MR. HIRAM SMITH.—It seems to be the opinion of many here that it costs something extra to make this pork and sell it. They are laboring under a great mistake. The last four or five years I have made this pork because I could make it the cheapest, and after a few local butchers found out that this pork gave better satisfaction to the retail trade, and made more sausage from the same cost of food, they told me to sell no more pork to Chicago buyers; that they would always give me a little more than I could get to ship it upon the markets of the world. They wanted it for their local trade.

MR. GORDON.—I know the Deerfoot farm pretty well. I know Mr. Burnett pretty well; I have been there a good many times and studied out that question. It is largely a matter of curing with the Deerfoot people. Mr. Burnett buys the average pork of his own neighborhood and cures it. I remember some years ago going to England and sitting down to breakfast the first morning and admiring the bacon. I said: "If I could only get such bacon as this for breakfast in America, I would eat it every morning." I was a little surprised when they told me it came from Milwaukee, and showed me the brand. The trouble with the average bacon as found in the village grocery store, is that it is improperly cured.

Now, isn't there right in this vicinity a market for such a product? Isn't there a big reputation for the Oconomowoc sausage in the Chicago market? The Oconomowoc people make a market for that kind of pork. Last summer they asked me if I had not some nice lean fed hogs, and told me, if I had, to ship them down and they would pay considerable more for them than the ordinary corn-fed hogs.

There are butter and cheese factories at almost every corner in this wide State. The making of butter has been systematized until Wisconsin creamery butter will outsell any creamery butter in the world. Why not have some co-operation or system in connection with the bacon-curing process? Why should not the farmers who live near together get together and put in a curing establishment and start a business? I believe it would not be long, if the product was what it ought to be, before a good trade would be established in Chicago. There ought to be a chance in this State for an industry in curing pork, and it is, after all, as much the curing as the feeding.

PROF. HENRY.—My main point in this work is not that we shall have all lean meat, or all fat meat. It runs in the direction of breeding. I don't believe you can feed lean meat into a mature hog any more than you can feed constitution into a man. Muscularity is something that comes from constitution. You cannot feed muscle into a prize fighter. When he goes into training he does not increase in muscle; he trains water and fat out of his body. What I want is that our breeding stock should have the proper proportion of bone, muscle and fat, and you can't make muscle and bone with corn only. If you want to fatten, you can feed corn exclusively for a few weeks, but do not understand me that you want to go into producing that kind of hogs. I want you to have fair judgment in raising your breeding stock, and not be satisfied when your hogs die and prove unsatisfactory, but look into it and find out what is the matter. There must be something wrong in the way we feed if we have that kind of result.

MR. LOUIS.—I want to say this about the Milwaukee bacon: When I was at Mr. Plankinton's slaughter-house I saw one thousand selected hogs—selected for the purpose of going to the English market. Their cellar is about one hundred by one hundred and eighty feet, and the pork was piled up about four feet and a half high, all in process of curing. I asked the manager of the packing house if this pork was the same as the hogs that were killed to-day by selection. He replied: "The majority of it is, because we can only get that kind of bacon, or that kind of cured pork, out by selection, because our hogs, as a general thing, are corn-fed hogs;" so you see even the packing-houses have an eye to selection.

MR. HOXIE.—I have two neighbors. One of them put his shotes into a clover pasture in the spring and kept them there and fed and fattened them in that same field. He had enough to make two car-loads. They sold in the Chicago market for fifty cents a hundred more than any hogs that came in that day, because they were strong of muscle and bone. The others were fed on corn and did not have the strength and muscle to bear the shipment. That was sometime ago. Since then, Prof. Henry has shown us the reasons why these results would follow, and I, for one, as a Wisconsin man, feel proud that the State of Wisconsin has the the experiment station that we have, and that we have a level-headed man to work it.

MR. MCKERROW.—The Oconomowoc sausage factory has been mentioned here. Mr. McDowell runs this establishment, and a friend of his was at my place last fall, and looked over a lot of nice healthy hogs, and he said: "If you want to sell those hogs, Mr. McDowell will give you a cent a pound more than the market price, and he told me if I saw any such hogs as this to tell the owners to drop McDowell a card. He wants nice, young, thrifty hogs, not very fat. There is a gentleman named Nye, who lives between Appleton and Green Bay, who told me, two years ago he had built up a good trade on this pork. He started with a couple of six-months-old pigs that he tested. He sold them to a gentleman in town at the market price; the next fall he wanted more, and then he began to sell in Green Bay, and he says he cannot furnish enough hogs for the business. He gets two cents a pound more for them than his friends get, and he thinks in time he will raise it three or four cents. In this audience I see a Waukesha County farmer who has been treating hogs in this line for some time, and I believe that he gets more for the hogs that he sells in Milwaukee than the going price. I wish you would tell us, Mr. Hodson, don't you get more for these pigs of yours?

MR. HODSON.—Yes.

MR. HARDY.—The question with the farmers is, is there any more profit in selling these hogs? Is there any more money in it to the farmer if he sells a hog weighing 200 pounds and gets ¾ of a cent more a pound for it than if it weighed 250 pounds?

PROF. HENRY. — With the average breed of hogs that we handle here, there is very little profit after the hog weighs 300 pounds. The most pork is made with the least feed immediately after the pig is weaned. A pound of feed will produce more pork then than at any time in the pig's life. As that pig grows older he costs more every day. You can see that when he is a 100-pound hog he has to keep up that 100 pounds every day; he has to vitalize it, and then he has to add his weight to that. Up to the 275-pound or 300-pound point, in some cases the hog does not grow much more expensive, but after you touch 300 pounds it goes up very rapidly. For instance, when a hog weighs 100 pounds it will take, say, 3½ pounds of food to carry him for a certain time, but after 300 pounds it will take 7 pounds to carry him for the same length of time. If our pigs are worth so much, my judgment is we will not carry them over 200 pounds; but the way we raise them we have to carry them further, up to 300 pounds. If we can buy pigs for the same price, we had better sell them when they weigh 200 pounds, and put that money over into another animal. There is no place more unprofitable for a farmer to put his money than into a big hog or steer. We are weighing steers at the farm every day, and we are weighing their food and I can make more money with a little calf for a given weight of food—with a 200-pound calf—than I can with a 1200-pound steer. I have had my students figuring on that thing this winter, and they are pretty well satisfied.

MR. THOM.—I have in mind a steer 5 years of age, that weighed 2000 pounds, fed for 365 days the same feed that he received the years before, and he didn't gain a pound; weighed 4 pounds less.

MR. WYLIE.—There is no time in the life of a pig that you can make pork so cheaply as you can between the weights of 50 and 75 pounds. After leaving 75 pounds your feed is costing you a little more right along until you get up to 250 pounds. At 250 pounds their feed and every pound you put on is costing you 25 per cent. more than it did between the weights of 50 and 75 pounds.

I would consider about 15 pigs, of the age Mr. Van Dusen speaks of, as many as should be allowed to feed and sleep together. Pigs can be grown far more evenly and with less liability to disease if divided up in this way, each lot having free access to pasture with a dry place to sleep and a clean place to feed. With protein food and proper sanitary regulations, the danger from disease will be so reduced as to practically cut no figure in swine raising.

SUPT. MORRISON.—The great fact that a certain amount of food goes to support, and all that is consumed and appropriated above that to growth and profit, must be kept in mind by every one who expects to make a profit in growing or feeding stock. It is the idea that underlies all successful feeding operations. It follows, then, that the animal which can turn the most surplus food into marketable flesh is the most profitable animal to feed. Sir J. B. Lawes found by experiment that cattle utilized 8 per cent. of the dry matter of food consumed, sheep 12 per cent., and swine 20 per cent. As the difference is slight in the amount of food required to support life, in proportion to weight, in these three three domestic animals, it is clear that the hog is by far the most profitable machine for converting food into marketable meat, and the large percentage appropriated accounts for the rapid gain in flesh under heavy feeding. It should, however, be borne in mind, that the quality of the food consumed by the hog is more valuable than that consumed by either the steer or sheep. But, with all due allowance for the difference in food, there is still a handsome margin in the hog's favor, as the cheapest producer of meat on the farm.

MR. SAWYER.—Through the great corn belts of Illinois, Missouri, Kansas and Nebraska we have immense corn crops, and an immense quantity of hog cholera. That point comes in right here. It is a great question whether our hogs are likely to have hog cholera or any other disease by our present way of feeding. If the pig's blood is 25 per cent. stronger by feeding, as Prof. Henry suggests, and the liver is heavier and the kidneys are heavier, the question is whether that will not make the animal less liable to disease. A good many of our hogs eat up our corn crop and then lie down and die, and we don't get anything. The stations have offered immense rewards for cures for hog cholera. I believe Prof. Henry's theory is working toward a solution of that problem. You cannot take an animal that has fed on corn for two years and cure it of hog cholera, but improving the breed is the best cure for the hog cholera that this country has ever seen.

MR. VAN DUZEN.—I have had some very severe experience with that disease in buying Western hogs, and I am satisfied that we cannot expect to fight it, even by feed. I will say that my experience has been that pigs are the ones that I have made money on, not wintered hogs, although I paid more than 10 cents a pound the next year to try to do the same thing. I bought about 150 pigs from 4 to 8 weeks old. They were well raised, all on one farm and about one age, and the animals were fed from the silo, together with bran and middlings. They grew very nicely, but these pigs, after they got to be about 3 or 4 months old, took the hog cholera from some wintered hogs that were kept in a separate field. I was so careful as to have separate men attend the separate lots of pigs. I put the pigs in separate pens, 25 or so in a pen. They never had a bit of grain or corn meal. They had been fed on middlings and other grain in connection with buttermilk, and were very thrifty and strong, but I lost from 30 to 40 per cent. of the lot, some from each and every lot that I had. I speak of this to show that while I do not doubt that, according to Prof. Henry's theory, we can make stronger pigs, and that they will be less subject to hog cholera than pigs fed upon corn alone; nevertheless, it is not safe to expect to fight the disease in this way. I can bear out the other statement that is made that it is more profitable to feed young pigs. Those pigs that I fed from the spring until September, I got 7½ to 9 cents a pound for, and when the ordinary time came for selling ordinary hogs, dressed pork was down to 6 cents.

MR. WYLIE.—It makes no difference how your hogs have been fed, if they are exposed to cholera, they are liable to catch it; but with this system of feeding that we are talking about, the cholera will not originate in your own herd.

MR. LOUIS.—We receive hog disease, as a rule, from infected districts; that is certainly true. Four years ago a gentleman bought two brood sows in Eau Claire, from a car-load of hogs that came from Kansas, and which were diseased. He bought only these two, and, being confined in a pen nine days, they became sick with hog cholera, or hog fever, or whatever we may call it, and the disease spread down the Chippewa Valley, and across the Chippewa river to the West line of Dunn County. Then a large lumber firm keeping 800 hogs sent for me and asked: "Mr. Louis, what will be our preventive against the disease?" I said: "Don't feed any meat from your slaughter-house; keep your establishment clean, that is, your hog-yards and the like; have a high, sanitary care and don't buy any live hogs or any pork." My caution was not heeded. They bought live hogs, and in November disease broke out in their yards. The disease was brought fourteen miles by importation. I was asked to come over and see what I could do with the hogs. Of course they could do differently from any farmer; they could give me twenty men at a moment's notice. I had the hogs passed through, one by one. Every hog that showed disease was killed, and the others were transferred to new yards. Mr. Knapp gave these hogs, by actual weight in the drug store, ten drops of carbolic acid for a week in succession. They lost one hundred hogs, but the disease stopped.

MR. STICKNEY.— The question was asked here whether it didn't cost something to find customers for these better products. Of course, for the first customer, or the first ten customers, it does cost something, but after that those better products find their own customers. If they are used, they are appreciated, and every customer finds others, and in a very brief time it becomes much easier to market those better products than the common ones. In a load of fruit brought in the market to sell, the finer fruit sells, while the poorer is rejected or sold at a price that does not pay. Every farmer knows that a better product of any kind will sell when he can't sell the poorer at all.

MR. FLEMING.— Is it possible to feed a hog for eight months and make him weigh two hundred and fifty pounds or over, and at the some time have him fed for lean? If it is, this can be done and done in such a way that the extra price that is received from that pork makes it profitable. I believe you are a unit in believing that the profitable time for disposing of pork is at about eight months. I do not believe that is invariable; I think the surroundings a man has for raising and feeding those hogs cuts a material figure. He can do it if he is a dairyman. I believe with the aid of the silo he can winter hogs and sell them at about a year old weighing about three hundred pounds and at the same time feed for this much desired lean.

MR. CONVEY.—The gentleman has answered his own question. Where the by-products of the dairy are used, there is no difficulty in securing the lean meat and the growth too; that is with good breeds of hogs.

For my part, I do not think it requires any particular skill to cure pork properly. Every man has the means at hand of very cheaply curing meat and putting it on the market. In my neighborhood I have noticed what they call breakfast bacon, which sells for fourteen cents a pound. One gentleman near us sells several thousand pounds at that rate.

MR. R. FARGO.—Mr. Fleming, how do you feed your hogs?

MR. FLEMING.—I feed largely on skim-milk, being a dairyman, and considerably on grass in the summer time. I feed young hogs three times a day, and older hogs I would not care to feed more than twice a day; but my rule would be to feed them as often as they showed an ability to utilize the food. I feed my milk cold in the summer time, and without freezing in the winter time.

MR. BEACH.—I buy my hogs, keep them about sixty or ninety days and then sell them. I buy them at about 100 to 150 pounds and feed them and sell them at 200 pounds, any time when they will bring the highest market price. I feed milk and give them all the green feed they will eat. I cannot always feed the milk sweet in the summer time, though I think it is better sweet; but the hog will eat it sour if you give him meal enough. I think there is no profit in feeding a hog after he weighs 250 pounds.

QUESTION.—Does the fellow of whom you buy them make any money?

MR. BEACH.—Yes, he makes more than I do. He can make more on the first 150 pounds than on the next 150.

MR. HARDY.—It seems to me that the supply and demand has something to do with this. I have known the time when a 300-pound hog would bring very much more in the market than a 200-pound one.

MR. HODSON.—We find the best results by feeding young pigs three times a day. If we feed oftener they seem to be more restless. When they get to be three or four months old, we feed them twice a day and give them all they need. We send them to market when they weigh 175 to 200 pounds. Our winter pigs we sell in the spring. Our March pigs we sell in August or September.

MR. LOUIS.—I would like to know what is the use to kick against the pricks? In a late swine-breeders' convention in the State of Indiana, one of the members was appointed to make inquiry at the different packing houses what kind of a hog was wanted in the present market. The answer from six of the largest packing houses was: "We want a hog that weighs 250 pounds." Now, why should we kick against something that is to our profit?

MR. TOOLE.—I think it is plainly indicated that we in Wisconsin may open up not only in our near cities, but in the markets of the world, a better product and better prices for our product; but certainly with all this breakfast bacon and all this sausage, the lard will be on our hands. Still I want to call your attention to the encouraging fact that in all the towns of Wisconsin, the people, if they can buy farmer's lard will not buy Chicago lard.

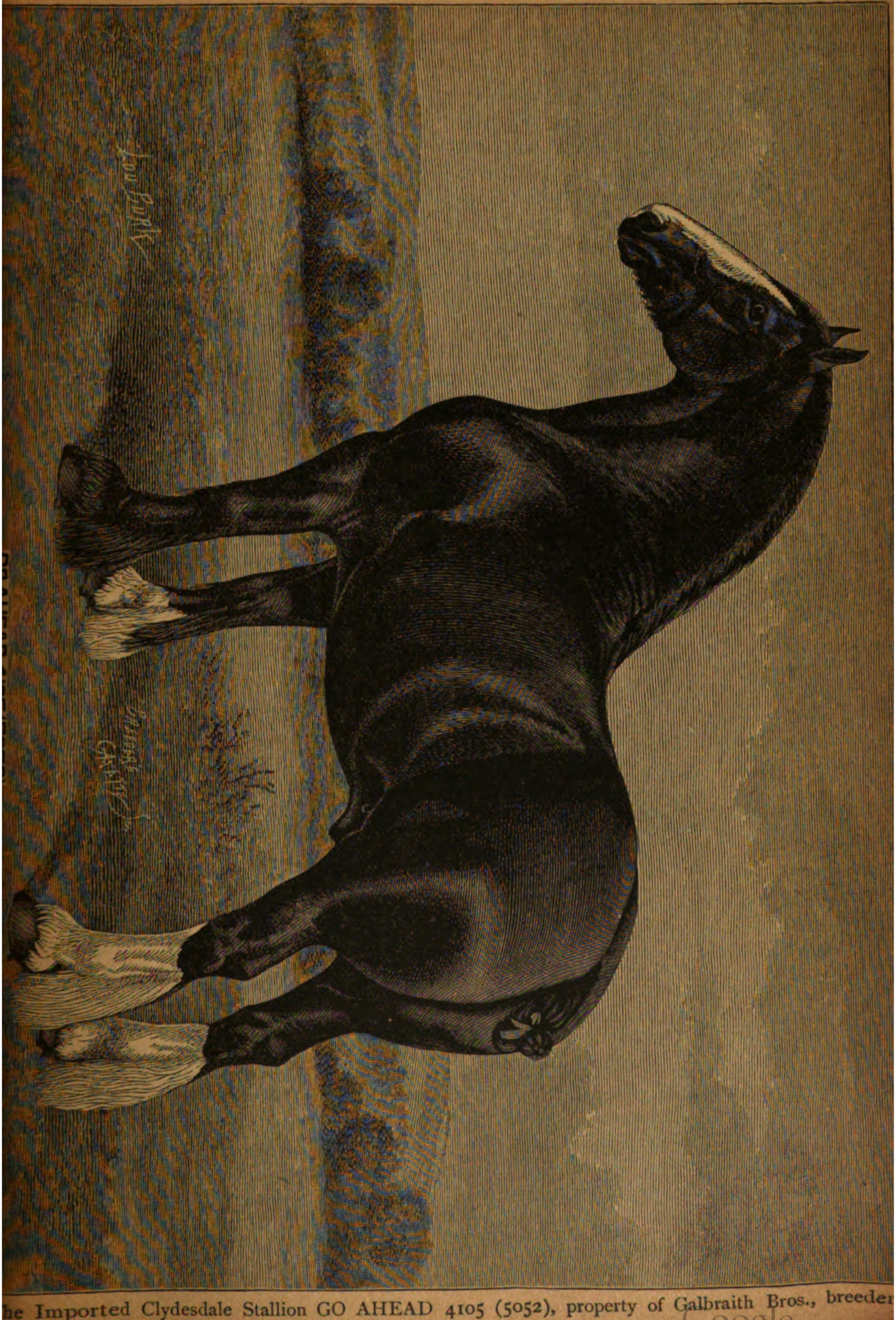
MR. VANDUZEN. — Simmered right down to the real question, we must suit the product, whatever it is, to the market we have to supply, and if we believe there is the most money in supplying a certain kind of butter or a certain kind of hog, then we must find the market that wants that kind of butter or hog, and if the farmer hunts out the market that wants an article that he is preparing, and prepares that article in a way to get a reputation out of it, and it deserve a reputation, he is certainly going to make money out of it. I have some doubts about three times a day being often enough to feed young pigs. We know that they are in a habit of getting their dinner whenever they want it before they are weaned, and feed oftener than that. Just before I left home I sold twenty-five pigs, all just eight weeks' old; they each weighed close to twenty-five pounds.. I fed them about as near right as I knew how, and sold them for five dollars apiece, to go into a creamery just for their feeding value.

PROF. HENRY.—I want to call the attention of the farmers to the wonderful changes that are going on in regard to the development of this country. A Massachusetts farmer said to me, coming on here: "There are farmers over a vast area of this country feeding hogs on corn worth from fifteen to twenty cents a bushel, on land worth twenty dollars an acre, farmers living in cheap houses, without many of the comforts of life that Eastern farmers have. You are competing with these on $40., $50 and $60 an acre land. Down here are two vast cities with men worth all sorts of fabulous sums, and eating all sorts of good things." This has come up within the memory of many. Now, shall we throw everything into the hands of a few Chicago monopolists in the way of this hog business? Shall every hog come into town and go into a car and into Phil. Armour's packing house? You make a fuss about binding twine monopolists, or something of that sort, spend lots of time and talk and money at it and yet you stick to this same plan with your hogs. Wisconsin pork and Wisconsin cheese ought to go down to New York and sell on its merits and reputation, so that the New York folks will look for the Wisconsin brand every time. Let us boycott the way that the general hog business has been running, as much as we can, in a business-like manner. If your neighbors here in the city have money and will pay fifteen or twenty cents a pound for sausage when ordinary sausage is sold a little cheaper, let us make the money. I don't say this to you old farmers. Many of you have done your work, but don't stop the boys. Because the old man wants to haul the hogs to town on a wagon, don't think the boys must do so. You bought land at $1.25 an acre, and you have done well because you have held it, but remember your boy has to take the farm at $50 or $60 an acre. You see the times are changing, and if there is anything in it, let us get it out of it.

MR. WYLIE.—Altogether, figures and experiments go to show, beyond a doubt, that the largest returns for food consumed are made in the young and growing animal. There are other conditions connected with swine raising that farmers do not study close enough. One of them is the markets. A study of the pork market for twelve years past will show the highest price each year, without variation, during the months of July and August, and the lowest generally during November and December. April pigs can hardly be ready for the July or August market, but are usually sold when packers are getting all they can handle, and are "bearing" the market. Thus the profit of early maturity is frequently lost by the lowness of the price. Under certain conditions, farmers could have the pigs farrowed in June or July. At this season the brood sows and young pigs will almost take care of themselves, and a larger per cent. of pigs be saved than if farrowed earlier in the season. The pigs can be kept gradually growing through the fall and winter, and in spring given a run on clover or bluegrass for a month or two, and then, with a crib of old corn, they could be got ready for market when pork is highest.

The main objection to this system is wintering the pig, and as pigs are commonly wintered in this State, they do not pay for the food consumed; but with proper shelter and care, pigs farrowed in June, July, or August, can be wintered in Wisconsin, and wintered at a profit. The principal advantages of this method are selling when pork is highest, and the benefits derived from a month or two of pasture in the spring. Grass, it must be remembered, is the cheapest feed in the whole list, and pigs that have been wintered are in just the right condition to make the best kind of gain on it. They have the advantage of making the most of the grass at a season of the year when it is at the best, and after this run on grass their stomachs and general system are in just the right condition to make the largest possible returns in pork for the corn consumed.

Your April pig, although he eats a little grass during the summer (and what he eats tends to keep his system in condition and so far helps him), yet a pig under four months old will make no substantial gain on grass alone. By the time he is old enough to utilize grass profitably as food, the best pasture is gone. Of course, conditions and circumstances, the kind of farming you are engaged in, have something to do with whether you adopt this method or raise an April pig (March pigs are too weak), and sell him in the fall. The



he Imported Clydesdale Stallion GO AHEAD 4105 (5052), property of Galbraith Bros., breeder
importers, Janesville, Wis. See page 284.

wintering system is more applicable to farmers who raise car-load lots, than to dairymen or those who raise but a few.

MR. THOM.—I want to say one word in the same line. We ought to begin to do our own business instead of having somebody else do it. Even if it don't pay on the start, we have the comforting assurance that we are doing it ourselves. For instance, seven-tenths of the farmers of Wisconsin are carrying their butter down to the corner grocery and taking what the grocer has a mind to give for it, and he puts the price on his own goods and makes you take them in trade. You have milked the cows, done the work, and he fixes the price and you take it. I have not anything against the grocerymen, but before I would patronize that kind, I would see him hanged higher than Hamaan. I remember about the first money I ever had—$12.50—for working two long, hard months in harvest. The proprietor gave me a $10 bill and $2.50 in change. I walked home four miles and lost it on the way, but I hunted around and found it, and the next day I walked to a village store and threw that ten dollar bill very independently down on the counter and said: "Can you give me two fives for that?" Then I went across the street to another store and threw them on the counter and I said: "Can you give me a ten for them?" It was the satisfaction of doing my own business.

So I say, a man who don't eat his own dinner never can grow in size, and that man who does not do his own business never can grow in breadth and power, and it is time that you and I stood on our own rights and asserted them and had something to do with the business that is going on in this great commonwealth.

CAN WE GROW BEEF PROFITABLY ON HIGH-PRICED LAND?

By H. C. THOM, Madison, Wis.

Slip-Shod Handlers of Scrubs.—So long as the beef market needs a float, and Wisconsin owns men who hope to foster a profit dollar, slip-shod handlers of scrub stock may join hands and fortunes with Milwaukee's almond-eyed citizens and "take a walk." It is with fear and trembling that I pronounce that fatal word "scrub." It is like unfurling a red rag before Mexico's idol. Some wise individual is wont to spring to his feet and carry an assemblage from the winding paths of the sage-bush plains to the Arabian sands in a vain and inglorious search for a thoroughbred. This blooded solon who is indigenous to the stamping grounds of agricultural societies and State institutes, feels keenly that if he can command the attention of one man in an audience of 2,000, for ten minutes, he has the unbounded gratitude of the remaining 1,999, whose ten minutes each represent about three days' time. Suffice it to say that we mean a class of cattle that does not grow poor from dragging about what they eat.

A Lesson from Low Markets.—In our opinion the low market referred to is of value to Wisconsin feeders who are not driven from the business. The man who jumps from one line to another when he sees a red flag flaunting over his market, deserves but little sympathy. It is well that the eternal fitness of things gives him a low price, in his new venture, just when he gets ready to turn off the largest product. When the low market does come, the intelligent feeder and business man does not waste his vitality in trying to raise prices by grumbling about the times, but immediately turns his attention to producing an article at less cost.

Wasting Forage. — The severe drouth of two years since drove the truth home, that Wisconsin farmers had been wasting nearly enough forage to carry the stock through the winter. Men of straitened circumstances fell down on their knees before a corn stalk and lifted their hats respectfully when they passed a straw stack.

Feeding Steers for the Block.—One who contemplates feeding steers for the block need go to no great expense. We venture a maxim here. When no one wants an article, buy. When people are tumbling over each other to get it, sell. A thoroughbred sire, a registered animal of the beef type, is the only change that need be made. This will place you in possession, in a little time, of grades that will get more of a bushel of corn on the outside of the ribs than would stick under the pelts of a dozen scrubs. (A humble bow to the man who says, "what is a scrub?")

Hints on Feeding Calves.—A calf should be taken from the dam at two days of age. It is unwise to withhold the first milk of the mother from the calf. The calf should get whole milk for one week, and then skim-milk may be introduced by degrees, thus getting him on skim-milk entirely when two weeks old, and none the wiser for the change. Some may say that wiser is not applicable to a calf. Calves have been known to play with a feeder, and take every trick. As a rule, the trouble is we try to feed calves when they are not hungry. Then, too many have a blind idea that a calf can draw milk through a finger. It is an easier operation to probe the finger. Give the calf two fingers, and we have a machine, as good for the purpose as a nursing tube.

About the time the calf is on skim-milk entirely, whole oats placed before him will stick on his nose, and he unconsciously learns to eat. The ration of oats should be increased to keep pace with the assimilation. Another advantage in feeding oats is that, in eating them, saliva is absorbed, and he never gets that pernicious habit of pulling another calf's ear. A calf shows best treatment when fed three times a day. Two or three quarts of milk will answer.

Fresh water should be within easy reach. A calf will do better turned in a lot without a blade of grass than he will on the freshest of pasture. A shed from the sun and a lock of dry hay are essential to rapid development. Milk should not be fed sour or cold. The finger is a good thing with which to point out neighbors' faults, but does not serve well as a thermometer. One can get along with his wife much better by heating water than he can by burning milk to the bottom of a kettle. A kettle of boiling water will raise enough milk to blood heat to feed twenty-five calves. More calves are spoiled by over-feeding than by starving.

The oat ration should be continued

until the calves are a year old and turned to grass. Feed milk as long as you have it in the fall. Calves that are intended for the block should never be introduced to a stanchion.

Sheds — Dehorning — Stables. — A good shed, liberal bedding and liberty, make a good match for fat calves. Ensilage, oat straw and bran or oats make a growing ration for yearlings. Horns should be taken off before turning to grass, in spring, when one year old. Upon reaching eighteen months, steers should be fed in barn or shed with no floor. If the manger is raised two and one-half feet above the floor, it is not good economy to clean the stables from fall to spring. More straw can be converted into manure in this manner than by any other process. One need not fret about how much evaporates or how much leaches. All, both liquid and solid, is saved. Stables can be kept sweet by the use of land plaster. Steers that are coming two can be kept gaining on ensilage and straw.

Finishing for Market.—When warm weather comes, the cattle can be finished for the June market on corn and grass or corn and ensilage. Too much trouble? Do you know of any thing that is too much trouble for your acquaintances, if they can see money in it? If treated as suggested, these steers will weigh twelve hundred pounds, and are just what buyers want.

Cost.—What is the cost? A calf will drink twenty hundred of milk, which, at twenty cents, is four dollars. He will eat fourteen bushels of oats, which at thirty cents, is four dollars and twenty cents, and one dollar and eighty cents of dry forage, making a cost of ten dollars A ton of ensilage in the silo costs one dollar. The calf will eat two tons or two dollars worth. He will eat ten bushels of oats, or three dollars, making a total cost, at one year, of fifteen dollars. The rental of a good acre of pasture is five dollars, which will support two yearlings, or two dollars and fifty cents. A steer coming two years will eat six tons of ensilage, or six dollars, making total cost when he goes on grass, at two years, of seventeen dollars and fifty cents. A steer of two years, on grass, will eat ten cents worth of corn, per day, for ninety days, or nine dollars. An acre of good pasture will support two steers, fed on corn at the same time, for ninety days, which, at five dollars per acre rental, is one dollar and twenty-five cents, making a total cost of thirty-three dollars and seventy-five cents. One hundred and sixty acres of good plow land will carry twenty milch cows and turn off fifty steers a year.

Swine—Shorthorns.—Steers should be fed whole corn to finish them. While fed on corn the cattle should always be followed by shotes or breeding sows. By careful selection and good treatment, cows can be readily found among the Shorthorns that will give two hundred to two hundred and fifty pounds of butter; and although I have seen raving maniacs among Jersey, Guernsey and Holstein men, I have never found one who was so thoroughly demented as to advocate throwing that amount of butter away, even if it did come from the patient Shorthorn, that animal which has done more to educate and enrich the English speaking people than all other breeds combined.

MANAGEMENT OF PREGNANT ANIMALS.

By V. T. ATKINSON, V. S., Milwaukee, Wis.

The Fœtus.—The fœtus is nourished from the mother, though the fœtal circulation is distinct and different from that of the mother, that is, the blood of the mother does not circulate directly into the vessels of the fœtus. The fœtal circulation is made up entirely distinct and when the blood is placed under a microscope, it discloses the fact that the corpsucles of the fœtal blood are a great deal smaller than those of the mother. After half the period of gestation is passed, the fœtus takes on life. The fœtal heart may be heard beating, and the pulsations are a great deal more rapid than those of the mother, showing that it is entirely separate from that of the mother.

Periods of Gestation.— Of the different periods of gestation, I have made a little table which has been carefully compiled by some of the best authors. In the mare 340 to 350 days is the average, or between the two extreme periods of 300 to 400 days, according to Fleming; in the cow, 283 to 288 days, or from 250 to 300 days; in sheep, 147 to 151 days; in pigs, 120 days, as an average, or from 110 to 130; in the dog, 63 days, or from 55 to 70. The male fœtus is generally carried a few days longer than the female.

Care.— The pregnant animal should be kept in a condition tending to promote health in the ordinary condition of the animal, that is, there should be no particular pampering on account of the particular condition. Animals should have exercise and good nutritious food. The conditions of the surroundings in each case may call for slight variations, but the general rule should be such as would preserve health under ordinary circumstances.

Pasture—Stable — Medicine.—Hilly pastures should be avoided as much as possible, and slanting stable floors or deep gutters in which the animal is obliged to stand with the hind feet. An unbalanced position of the body, particlarly during the later period, by which the hind feet stand lower than the fore feet, will tend to bring on complications at the time of delivery. The doors of the stables, of course, should be so wide as to prevent any possibility of bruising. The animal should not be subjected to any undue excitement or worry by dogs. Surgical operations should be avoided, and when medicine is necessary, it should generally be administered under the care of a veterinarian.

Symptoms of Pregnancy.—Of the symptoms of pregnancy, the most characteristic is the enlargement of the abdomen. Another symptom that is mentioned by most of the authors is a particularly quieting effect that it sometimes has upon the animal, lately illustrated under my own observation in the case of a little mare that was brought to the farm, and used for some time, being perfectly quiet and easily managed until after she dropped her foal, when she became a perfect vixen, and I understand that that is her usual temper.

Another symptom that is described sometimes, is an enlargement of the udder, sometimes so far that a small amount of milk is found. That enlargement disappears and will re-appear again about the end of the period of gestation, when the milk will be secreted to nourish the fœtus.

About the middle of the period the fœtus takes on life or has power of motion. That motion is most noticeable in the morning, and may be made more violent by giving the female cold water to drink before she has any food; the cold water acting as somewhat of a shock on the fœtus. This is not a good practice, however.

When it becomes necessary to decide whether the animal is pregnant or not it can only be done positively by inspection, which can be made in the larger animals by introducing the hand through the rectum.

Delivery.—In the delivery of animals a great many obstacles are met with. When the period is complete, and the fœtus is ready for delivery, nature generally takes care of that itself. However, in many cases complications are likely to arise. I have brought with me some charts that illustrate those which are most common.

[Dr. Atkinson, by the aid of these charts, made many valuable and useful suggestions.—ED.]

Discussion.

PROF. NORTH.—Can you tell us what causes abortion in cows; and is there any cure for it?

DR. ATKINSON.—Professor Nocard, of France, has made a very careful study of that subject, and seems to establish beyond doubt that it is due to a particular germ that infests the uterus. He has found that same germ in the lining membrane of the uterus, and also in the base of the brain of the fœtus. He explains how this is the germ which causes what is called the bellowing calf. It is on much the same principle as that on which Pasteur explains his hydrophobia. When the animals aborts in a stable, she should be immediately separated from the other animals, and the stable disinfected. The fœtus and fœtal membranes should be destroyed, perhaps burned. For disinfection, he prescribes a regular formula, of which carbolic acid is an important feature.

QUESTION. — In regard to breeding mares, do you think there is any virtue in inserting the arm and opening the mouth of the womb for mares that are hard to get in foal?

DR. ATKINSON.—It is possible that induration may be the obstacles to impregnation, and it might be overcome in that way. There is no doubt that some good may be accomplished by opening the *os uteri.* It may be done by introducing the hand into the vagina and passing it slowly with the fingers, or introducing the speculum. The fibres will gradually relax and the mouth expand. That may be assisted by smearing the fingers with a little extract of belladona.

QUESTION. — In case you find the mouth of the womb firmly closed, would you advise bursting it open?

DR. ATKINSON.—Impregnation cannot take place unless the mouth of the womb is open. Of course, in order to operate intelligently there should be a speculum introduced to see exactly what is the matter. You might apply force in some part that might do injury.

QUESTION.—In case of advanced pregnancy of the mare, after the milk starts, there is a common impression that at that time the colt should be born. Have you had any experience with reference to aiding this by manipulation?

DR. ATKINSON.—No, I have not. My observation and my teaching all lead me to give nature its own course. I do not think we would be justified in interfering.

QUESTION.—Is it injurious to the mother to work her, up to a certain time?

DR. ATKINSON. — Pregnant animals should not be used for very violent rapid or heavy work in the later stages, nor should they be alongside of a wagon pole that might strike the side of the abdomen.

MR. CONVEY.—What method of removing the placenta would you recommend?

DR. ATKINSON.—There are two troubles likely to occur. One is the retention of the placenta, the other is the inversion of the uterus.

CARE OF THE BROOD MARE.

By A. O. FOX, Oregon, Wis.

Demand for First-Class Horses.—Concerning brood mares and their management, I shall speak only of their ordinary farm care, and must be allowed to draw freely from my own experience.

Before entering upon the brood mare question, I wish to say a few words about horse-breeding in general. The statement needs no demonstration "that an enormous and healthy demand exists for all horses that are each first-class of their kind." It is only the common sorts—the little low-necked, narrow-chested trotter that don't trot, and is too small and insignificant for business purposes; or the pig-headed, soft-jointed, sunken-eyed, lifeless sort of a cart horse—that will be left behind, eating their heads off waiting for a purchaser.

The American is a man of tremendous energy, and he wants his horses, like his wife, good looking, strong and energetic. In the draft horse, he does not want a great big beefy, lunk-head. He must be large, but full of character, clean-cut and flat in his bones; he must be deep in his body and muscles, and well ribbed up; he must be prompt and willing, and above all a good walker.

If a trotter, he must be not only a trotter in pedigree, but in performance, to be acceptable to the intelligent purchaser.

If a coacher or carriage horse, he must have all the essential qualities of tip-top breeding, a pleasant disposition, good size and color, with superb style and action.

Quality, Greatest Consideration.—Now, it is for the farmer who contemplates horse breeding, to suit his own taste, to investigate his individual resources, his capital and location, in order to determine which of these sorts are best suited to his requirements.

The splendid location of Wisconsin renders the breeding of horses one of the most certain operations that can be followed by her farmers. There will probably never be a time when a *good* horse will not sell; but I wish to extend this timely admonition, that there is a vast amount of capital invested in this horse business, and the number of breeders are constantly increasing. The time has come when quality must be one of our greatest considerations, if we wish to keep at the head. The State of Wisconsin is not yet classed as in the front rank among horse breeding States. Nevertheless, according to our State census, the value of the horses of Wisconsin is nearly equal to that of cattle, sheep and hogs all taken together. So you see we are not alone in this business, and remember, when we stand in close competition, it is quality that will size the buyer's pile.

The Great Key-Stone.—As to what breed may be the most desirable, that does not come within the limit, or purpose of this paper; but as the selection and quality of our brood mares are among the essential elements which go to make our success or failure, I cannot forego one or two suggestions. I regard the brood mare as the great key-stone, upon whose strength and quality depends the lasting character of the entire superstructure. This is especially marked in the short, but resplendent history of the breeding of the American trotter. It makes little difference how well bred the sire may be, if the dam is lacking in rich trotting top-crosses, there may be little expected from the produce. It is the wanton neglect of this principle which has made disastrous so many attemps, and it is a keen appreciation of it, and close application of it in practice, which has marked the success of other of our more advanced breeders. This same principle holds good all down the line. No matter what sort of horses we wish to produce, we must look for the prime factor in the dam as much, if not more, than in the sire. Let us, therefore, look carefully to the character of our mares; let us begin the weeding process and reserve for future breeding purposes only such as conform most nearly to our desired type. With such definite purpose in view, we can not fail to produce horses which will always be sought at top prices.

The Index of the Nerve.—A sluggish, lifeless sort of a mare will never produce much of a colt. She must have nerve, muscle and endurance. This is fully as necessary in a draft mare as in one designed for breeding roadsters or coachers. The bold, prompt walk, the index of the nerve, is of all the most serviceable gait. Without this quality, any horse, for whatever purpose bred, is at best a mere "dogan."

Getting in Foal.—Now, in reference to the management of our mares, we will first undertake to get them in foal. (Right here arises the many important questions relative to the care and management of the stallion, but as it does not come within that portion of the subject which has been assigned to me, I must leave it for others to discuss.) In Wisconsin, the majority of the mares are bred in spring. I do not approve of breeding earlier than May 10th, as my books show that the majority of mares bred prior to that time have been returned. The reason is probably found in the inclement weather, and a lack of that open condition of the mare's system which seems necessary to conception. I do not approve of breeding any mare that has not been a regular breeder, until she has been run to grass from three to six weeks, and has become what is ordinarily called "grassed out." I then take her up and put her to harrowing or plowing corn for a week or more, until she looks a little down in flesh; she is then given light work, or even complete idleness, in a box stall or paddock, giving her three full feeds a day of oats. In a short time she will begin to feel very bright and playful and to take on new flesh.

Just at this time she should be carefully observed, and upon any indication of heat, should be allowed to see the horse, and to be teased a little, but not to aggravation. I would "fire" a groom at once who would stand idle and let a stallion go to chewing up a mare. The stallion should work at the neck, back and loins never under the tail or at the nose, the latter being a frequent place of transmission of distemper and various nasal diseases.

If the mare is found in season, don't breed her until satisfied that the heat is well upon her. Then before breeding her, the mouth of the womb can be easily examined with the hand. If found closed, it must be carefully opened with the fingers, and treated with any simple penetrating oil, sweet oil or melted lard. In case of much contraction, we have used an ointment of belladona with good success. After receiving the horse, she is better tied up for the day in a dark, quiet place, with plenty of fodder to pick at, so as to divert her mind from herself. I do not approve of a long drive after breeding, although a short warming up before service may be of some use.

This may not be considered scientific treatment, but it has been attended with marked success upon our farm, and with some mares that had for many years been considered barren. After being bred, we now try to favor the mare for the next 21 days, to her first trial (we try our mares on the 21st day after breeding); if not found in season we then try her once a week for four consecutive weeks, after which, if not found in season, she may be considered in foal.

Working.— Meanwhile she goes into a regular work team until the bulk of the fall plowing is over. We then turn out to pasture all the mares that are supposed to be in foal, and leave them there until the middle of February. I think, as a rule, in the attempt to do well by our mares, many of us are apt to give them the very thing which should be withheld from them.

Winter Feeding Periods. — Our winter feeding periods last six months, during which time our mares are dependent upon whatever provision we may have previously made for them. They are usually stabled too much, and fed too much grain and other concentrated food; their blood becomes thick, and a general condition of congestion throughout the whole system follows. They become sluggish and inactive. The result of this folly is told the following spring, when the colts begin to come weakly, sickly and dead.

To Avoid Losses.— To avoid these losses we must furnish abundance of exercise, with mild laxative kinds of food. During my first experience with brood mares, about 13 years ago, we used to breed three to five mares annually, and from these we usually raised about two colts. We have good, comfortable barns The mares were worked hard and fed liberally on hay and grain. During the winter, if not worked, they were let out to exercise in the cow-yard day-times, and taken up nights. In spring, at foaling time, the foals would come large and limp as a dish-rag. More than half of them died. I like to see a colt come like a good lamb—thin and bony, but vigorous and lively as a cat. They will then take on all the necessary flesh, as they are possessed of vitality and strong digestion. This vital condition of the foal is largely governed by the habits of life of the dam, as well as by her temperament. We must, therefore, eliminate from her surroundings such forces as tend to these unprofitable results.

Exercise.—In the first place, I regard absolute freedom of exercise as imperative. That kind of exercise which she gets by being let out of the barn occassionally is not of much account, and may be, at times, a source of serious trouble, because of her dispoposition to run and play and caper about, and of other beasts to quarrel with her.

Feeding.—Too much concentrated food, too generous keep and too nice and comfortable stables are the sure forerunners of disaster to brood mares. The plan which, in my experience, has given the best net results, is to turn the mares out early in the fall, so that they may get thoroughbly accustomed to it. Then, instead of taking them up when winter sets in, we turn them into a field of reserve pasture, composed principally of blue-grass, or June grass, which has been previously set apart for them about July 1st. They are very fond of this feed, and keep in good condition on it. This reserve pasture is located near timber, in which the mares find their principal shelter. They soon learn to paw away the snow from the long cured grass underneath, and help themselves. Here they usually remain until about the middle of February, when the snow becomes so hard and crusted that they can not get to the grass. We then take them into large yards, in which are located common open sheds. In the middle of the yards are covered mangers, each of which holds one good load of straw. We fill these as often as required with oat straw, and supplement this with corn fodder. Towards the latter part of the winter we also feed ground oats and bran freely. When near foaling time, each mare is removed to our breeding barn, which is centrally located to three or four small fields or paddocks. In these paddocks they are always within close observation of the man in charge, and here they receive their daily exercise, with plenty of soft, nourishing food until the foals are about two weeks old. They are next turned into a field adjoining the railroad, where the foals become car-broken before they are a month old.

Diet.—The item of diet is very important, as it goes largely to determine the condition of the digestive organs of both dam and foal at foaling time. Anything approaching a heating or corn diet is absolutely destructive to both. Bran, crushed oats, oil-cake and moderate quantities of tame hay are among the best of foods at this particular critical period of foaling. Avoid the use of clover hay and rye meal. Unless the mare foals late in the summer she must have a good, dry, level bed to lie on; this simple precaution will tend largely to avoid bowel trouble in the foal, on account of getting damp or chilled. The closest of care should be given to the condition of the bowels of the colt for the first 48 hours after birth. Avoid allowing it to fill up with milk at one time —a little taken often is much the safer plan.

Care of Foals.

The Bowels.—As soon as the colt stands and begins to run about the mare and suck freely, then the bowels must move freely. They ought to move within 6 to 8 hours after birth—this is imperative. The first excrement is very gummy, and it is sometimes impossible for the colt to void it without assistance. The straining brings on inflamation of the bowels very rapidly. The outward indications of constipation are switching of the tail, pointing toward tha flank with the nose, labored and quickened breathing, with heaving of the flanks, and uneasiness of the hind legs. I have found the safest plan is to make it a rule to inject each colt during the first half day of its life, with about half a tea-cup of raw linseed oil in a pint of warm castile soap-suds; or warm molasses and cream, mixed half and half, will answer the purpose. If in great pain it may be allayed by an injection of half a teaspoon of laudanum in a teacup of warm water, and outward applications of hot flannel cloths or mustard and vinegar paste rubbed into the hair on the belly. Laudanum must not be given to a new born foal, through the stomach unless the bowels are free and open.

White Scours—During the first two weeks the foals are apt to be attacked with the white scours, especially if the mares have been kept in high flesh through the winter and foal early in spring. This is a very fatal disease and must receive prompt and careful treatment. The symptoms are generally a sour, white, watery diarrhœa, white fur on the tongue; irregular appetite, sometimes very ravenous; dry unthrifty skin. If the mare has been kept up on dry feed give her a dose of raw linseed oil with a tablespoon of laudanum. If the colt has good strength, I have found the following treatment very satisfactory:

When the first scour makes its appearance give, through the stomach, in a half tea-cup warm water, one flowing teaspoon of pure castor oil, 20 drops laudanum, ½ teaspoon carbonate of soda (or common baking soda). Apply at once on the outside of stomach and bowels a mustard pulp made by mixing mustard and vinegar into paste; rub into the hair with the hand or a flat stick; if the mustard is old or weak sprinkle a little cayenne pepper into it. The object is to heat but not to blister. Flannel cloths wrung in hot water will do, but require more attention, and the colt is apt to take cold after their removal. After the oil has operated and emptied the bowels, then give the following:

Make a tea of the inner bark of white oak. Give ⅓ tea-cup white oak tea, 20 drops laudanum, ½ teaspoon carbonate soda. This dose may be given 3 or 4 times daily until the bowels are checked. Care must be taken not to stop the bowels abruptly, the object being only to have control of the bowels and check them gradually.

Give Little Medicine.—Do not give any more medicine than is absolutely necessary. The colt should be kept from sucking too much, as most of the milk it takes is not digested, and only goes to clog up the stomach and bowels again making more trouble. The easiest way to manage this is to keep the mare milked out as dry as possible by hand. If the colt is weak, when it begins to mend a tonic may be given, composed of tincture of gentian one part, whisky one part, ginger tea four parts. Dose of mixture, one-half tea cup, three to five times a day. If stomach is still sour, add a little soda. We pay close attention to these small details for the first few days of the colt's life, and then he is generally no further trouble.

Results for Six Years.—This is, in substance, the plan which we have followed for the past six years, with particular reference to cheap management, and practical net results in strong, living foals. We have annually about 20 to 25 mares to foal, and our total loss of foals at birth, either foaled dead or dying from weakness immediately following birth, has been for the past three years just one colt per annum.

Ensilage.—To those who may not be so situated as to be able to furnish the above pasture, there may be a substitute for the green ration there supplied, in the use of ensilage. Of this I can only speak from observation, which is to-day in a very superficial form. I have this winter seen some 300 horses being kept on almost an exclusive diet of ensilage and oat straw. The ensilage was the B. & W. sort, very juicy and quite sour to the taste. I have never seen store horses in winter with softer, nicer coats than these; but it is yet quite a question whether this is just the right sort of food for the brood mare, and for the development of a strong, bony fœtus.

At Weaning Time—We find it most desirable to teach the colt to eat bran and oats by its mother's side before separating them. The colt will then wean easily without loss of flesh.

Maturing.—Now that we have our colt the next question is, what shall we do with him; what shall we make of him; for what purpose shall we mature him? I think the demand of our best buyers (those who pay the top prices) is for a large, active horse, with clean, flat bone, and well-muscled throughout; that while size is one of the prime considerations it is second to quality and finish. Assuming this to be the fact, then how shall we feed and mature our colts, so as to conform to these requirements? How are we to avoid the beefy, lifeless, soft-jointed, round-bone sort? If we expect to develop the bones and muscles of our horses to the greatest strength and soundness, we must see to it that our colt's food is of the bone and muscle-forming sort. My favorite ration for weanlings through the first winter is equal parts by weight of oats, corn and rye, or barley, ground together and mixed with one-third bran, by measure. In addition to this, I feed good hay. When first weaned, we feed four times a day, beginning about 5:30 in the morning and dividing into four equal periods. This plan is kept up until about Christmas, when we drop to three feeds a day, keeping up or perhaps increasing the daily ration. This winter I have, for the first time, begun feeding ensilage at noon. (The ensilage is made from the ordinary dent corn, fully matured.) I have nothing to say in its favor yet, as it is purely experimental.

Water—Exercise.—Weanlings ought to have a constant supply of water before them in order to drink, as has been their former habit when with their dam, "a little and often." My weanlings are allowed to run at liberty day-times, and at night they are shut up in the barn. A few tops of poplar trees, in convenient places for them to go and nibble. the branches, are much enjoyed by the colts, and much disliked by any worms which may infest them. In this manner they are carried through the first winter.

The Second Winter,—When they are yearlings coming two, they are kept in feeding lots provided with open sheds and covered straw racks. They are fed twice a day. The first feeding in the morning is corn fodder without ears, usually thrown in bunches on the ground, as we find that in fair weather they eat it cleaner in this way than any other. At noon they get a liberal feed of corn or oats and bran and as much oat straw or hay as they will eat clean before night. At night, if cold and stormy, they are given a little more hay or straw. The treatment for the third winter varies according to the purpose the young horse is about to fill, some going among the brood mares, some into the yards to finish the breaking and some to be stabled and fitted for market.

Breaking.—In breaking our colts we use the little Jockey cord in its various forms, our system being mainly that of

Prof. York. We have not used a bitting rig for ten years, nor would I allow one in use on my farm. Our constant endeavor is to breed the necks up, rather than to try to raise them up by mechanical power; but if high checking must be resorted to, we prefer to do it with the ordinary bridle and by slow degrees. We break our colts single first, in a low cart made of white oak grubs, after which they are driven double by the side of a gentle mare.

Colts should be thoroughly handled before they are a year old, halter-broken, and taught to lead up promptly, and their limbs all handled. They will be pleasant and tractable always afterwards, and right here is one of the chief secrets of having gentle horses. Find me the farmer who always handles his colts when weaning, and I will warrant you will find a lot of gentle horses about him, and, furthermore, a year ahead of those of his less careful neighbor.

Marketing.—When we are ready to market our horses, let us do it as our trusted merchant sells us a suit of clothes. Let us represent them just as they are. The dealers will soon find us out, and we will more than make up on the sale of our best horses what we may have sacrificed by telling the truth about the poorer ones. Then, when we meet the grim face of death, and pray to God to save our souls, and begin to hunt around to find them, we shall not be confronted by the awful apparition that we have sold our souls to sell a horse.

BREEDING DRAFT HORSES.

By S. D. THOMPSON, Wayne, Ill.

A Growing Industry.—Draft horse breeding is a growing industry that is rapidly assuming a prominent position among the agricultural pursuits of the Northwest, and especially in Wisconsin, with her great pineries and ore fields to the North, and four of the most important cities of the nation adjacent to her borders—sources of demand that can be depended on at all times, to offer a market for high quality draft and carriage horses. With this great demand open before the people of your State, but slight attention has been given to the breeding of draft horses, except in a very few localities, until within the last five years. There are, however, unmistakable evidences of a growing interest commensurate with the importance of the industry which has manifested itself in the eagerness of the people for information as to the best breeds to accomplish the desired purpose, and also the readiness with which all breeds of heavy horses offered upon the market have found purchasers, regardless of their adaptability to your uses.

The Loss From Breeding Trotters—The general farmer cannot afford to breed for speed, for do we not all know that breeding a "real trotter" is a chance result, a bit of gambling luck, a fortunate ticket from the lottery whose wheel in revolution throws out a hundred blanks to one numbered card? Now and then comes a prize—a trotter that trots down in the "twenties," or below, and the press of the country heralds his fame, and the fame of his breeder or owner; but the press, I notice, does not tell the miserable story of the multitudinous failures which came before and after the one brilliant hit; of the thousands of dollars, the years, the study, that were spent in the effort to produce the one trotter; and of a landscape full of colts and horses that could neither trot in "twenty" nor anywhere else to the watch that gave them any value, and which could not "road" twelve miles an hour for three hours together on a country road, to save their own lives or that of their breeder. Verily, what a farce and loss this wild, frenzied effort on the part of our people to breed trotters has been. The loss from this unbusinesslike ambition has fallen heavily enough on the breeder himself, as all who understand anything of the subject know, but the private loss is as nothing to that far heavier one which has fallen, because of it, upon the country at large.

The Roadster and Coach Horse.—The general farmer cannot afford to breed for speed, but if it is his desire and ambition to breed to a light horse, there are two styles of horses for which there is a genuine and earnest demand in this country to-day, and for this demand there is no supply, and no source of supply. The first is the roadster, and the second is the coupé, or coach horse. The former must be of good size, handsome to the eye, docile, and able to pull two persons from ten to twelve miles an hour, and burst out, when called upon, to a three-minute gait. The latter must be of larger size, of fine form, of good, solid color, gentle in stall and harness, of high, showy action, and able to pull a coupé or carryall eight miles an hour. Such horses will sell at good prices, and whoever breeds them will find himself breeding to a profit, and a good round one at that.

There is in France a race of horses, some of which have been imported to this country, which crossed on our native stock will, I believe, give us the people's horse, or the horse of the future. His appearance is noble, his form handsome, his temper gentle, his spirit high, and his blood, through many clearly-defined and well-known channels, flows clean and straight from the desert. Centuries of governmental supervision and controlling authority have placed his pedigree beyond dispute, and made him the embodiment of prepotent forces, to a degree unmatched in the world beyond the limits of the Arab. From the use of these stallions I premise that, in a few years, the finest carriage horses in the world, and a noble class of roadsters, will be seen on our city and suburban roadways, and the breeders of the country will have what they need—a horse that will sell, and sell for a good price, and sell as soon as he is educated to go safely to harness. That is the kind of horses gentlemen want and are ready to pay for.

The Wants of the Yankee.—I am assured that the farmers of Wisconsin are clearly convinced that they must breed heavier horses; that the only information that they want is to know what breed of stallions to buy in order to produce the best horses for the market they have to supply, as well as to perform the labor to be done on their own farms.

The wants of our people are peculiar to themselves, as no country is exactly like ours. The rapidity with which everything moves is a marvel to all who have not become Americanized. The civilization which we Americans are building up on this continent is such as the world never saw before. At least, neither the history of letters nor that written fragmentarily in ruins, gives us the least hint of one like it. The base of it is material development; above this, as a foundation, is a mental development wholly unprecedented.

Hitherto, electricity has been of the earth and air; in the American it is incorporated. Lightning in the clouds is an old thing, but lightning in human brain-cells is a new thing under the sun. As Lowell says, in Bigelow Papers: "They didn't know everything down in Judee," and Solomon, wise as he was, never mentally forecasted a Yankee.

As business men, we all belong to a "fast set." We eat fast, drink fast, drive fast. There is, therefore, a certain poetic harmony in the way in which we come into the world, act in it and get out of it. There is not a slow pulse in an American. He is all vitality. He thinks as he eats, and is a mystery to himself, for not one of us can tell ten minutes after eating, what we have swallowed. An American is like an arrow in full flight, flying so fast that he sets himself on fire and burns himself to ashes by the fierce rapidity of his own motion.

That everything to succeed, must adjust itself to this high-pressure principle, no one will deny; therefore, in prosecuting our research for information, it is indispensable that we keep our peculiar methods in view, and the natural conclusion will be that the breed of horses that can most nearly approximate our ways, is the one that will ultimately succeed; whereas, the lymphatic, sluggish or inactive breed will surely fail.

Let us then for a moment examine the characteristics of the different breeds of draft horses that are being imported into this country, and it is certainly fair to accept the descriptions of well-established authorities of the countries in which the respective breeds are bred.

The Suffolk Punch.—Youatt, who is an accepted authority on matters pertaining to English horses, says of the British breeds: "Horses for slow draft and sometimes for the carriage are produced from the Suffolk Punch, so called from his round, punchy make, and descended from the Norman stallion, and the Suffolk cart mare." The true Suffolk, like the Cleveland Bay, is nearly extinct. It stood from fifteen to sixteen hands high, of a sorrel color; was large headed, low shouldered, and thick on top; deep and round chested; long backed; high in the croup; large and strong in the quarter; full in the flank; round in the legs and short in the pasterns. It was the very horse to throw his whole weight in the collar, with sufficient activity to do it effectually, and hardihood to stand a long day's work.

The present breed possesses many of the peculiarities and good qualities of its ancestors. It is more or less inclined to a sorrel color. It is a taller horse, higher and finer in the shoulders, and is a cross with the Yorkshire half or three quarters bred. The immense power of the Suffolk is accounted for by the low position of the shoulder, which enables him to throw so much of his weight in the collar. Although the Suffolk Punch is not what he was, and the Suffolk and Norfolk farmers can no longer boast of plowing more land in a day than anyone else, this is undoubtedly a valuable breed.

The Clydesdale—Is a good kind of draft horse, and particularly for farming, and in a hilly country. It derives its name from the district of the Clyde in Scotland, where it is principally bred. The Clydesdale owes its origin to one of the Dukes of Hamilton, who crossed some of the best Lanark mares with stallions which he had brought over from Flanders. The Clydesdale is larger than the Suffolk, and has a better head, a longer neck, a lighter carcass, and deeper legs; strong, hardy and pulling true.

The Southern parts of Scotland are principally supplied from this district, and many Clydesdales, for agricultural purposes, find their way to the central, and even southern counties of England. Dealers from almost every part of the United Kingdom attend the markets of Glasglow and Rutherglen.

The Heavy Black Horse—Is the last variety it may be necessary to notice. It is chiefly bred in midland counties, from Lincolnshire to Staffordshire. Many are brought up by the Surry and Berkshire farmers at two years old, and afterwards send to the London market.

These horses are adapted more for parade and show and to gratify the ambition which one brewer has to outvie his neighbor, than for any peculiar utility. They are certainly noble looking animals, with their round, fat carcasses and their sleek coats, and the evident pride which they take in themselves, but they eat a great deal of hay and corn, and at hard, long-continued work, they would be completely beaten by a team of active, muscular horses, an inch and a half lower.

The only plea that can be urged in their favor, besides their fine appearance, is that as shaft horses over the badly-paved streets of the Metropolis, and with the immense loads they often have behind them, great bulk and weight are necessary. Weight must be opposed to weight, or the horse would sometimes be thrown quite off his legs. A large, heavy horse must be in the shafts, and then little ones behind him would not look well.

The Flanders Cross.—All our heavy draft horses, and some of the lighter kind, have been lately much crossed by the Flanders breed, and with evident improvement. Little has been lost in depth and bulk of carcass, but the forearm has been raised, the legs have been flattened and deepened, and very much has been gained in activity. The slow, heavy black, with his two miles and a half an hour, has been changed into a lighter and yet exceedingly powerful horse, who will step four miles in the same time with perfect ease, and has considerable more endurance. Sidney, Manager of the Agricultural Hall Horse Show, in his book on the horse, says:

"According to the agricultural writers at the commencement of the present century, there were distinct breeds of draft horses in at least half a dozen English counties. At present, all such distinctions have been effaced and until quite recently it was only the exception that the purchaser of a plow or wagon team made any inquiry as to breed or pedagree, unless it was of the Chestnut or Suffolk breed."

The True English Draft Horse.—For all practical purposes, the true draft horse of England, may be classed into the London Dray, the Shire horse, the Clydesdale and the Suffolk Punch, the Cleveland Bay having become extinct or nearly so

It is only within a few years that the Scotch have taken the lead in establishing a Stud Book for Clydes, and it was not until the year 1778, that the breeders of Suffolks followed the sound example.

The Shire horse is the final result of the improvement of agricultural horses commenced early in the first half of this century. He is found in the Shires, where the strongest class of plow horses are required—a breed (if it is a breed) which has superseded the Lincolnshire black horse.

As late as 1840, Mr. Burke, who was one of the editors of the early volumes of the Transactions of the Royal Agricultural Society of England, wrote in a note on cart horses: "A Lincolnshire black of the pure breed stands foremost in the rank of every cart-horse race in the Kingdom."

These are not my words, but come from the highest authorities in England. They claim nothing more for these horses than simply heavy draft at a walking pace; they are not made to move fast.

The Clydesdale,—As a breed, is but a descendant of the heavy Dutch horse, and from him has inherited his lymphatic nature, and slow-going pace, and the Shire horse, according to the highest English authorities, is scarcely a breed at all, being simply a modification, through the Clydesdales, of the heavy Lincolnshire black horse that Youatt says, "were adapted more for parade and show and to gratify the ambition that one brewer has to outvie his neighbor, than for any peculiar utility."

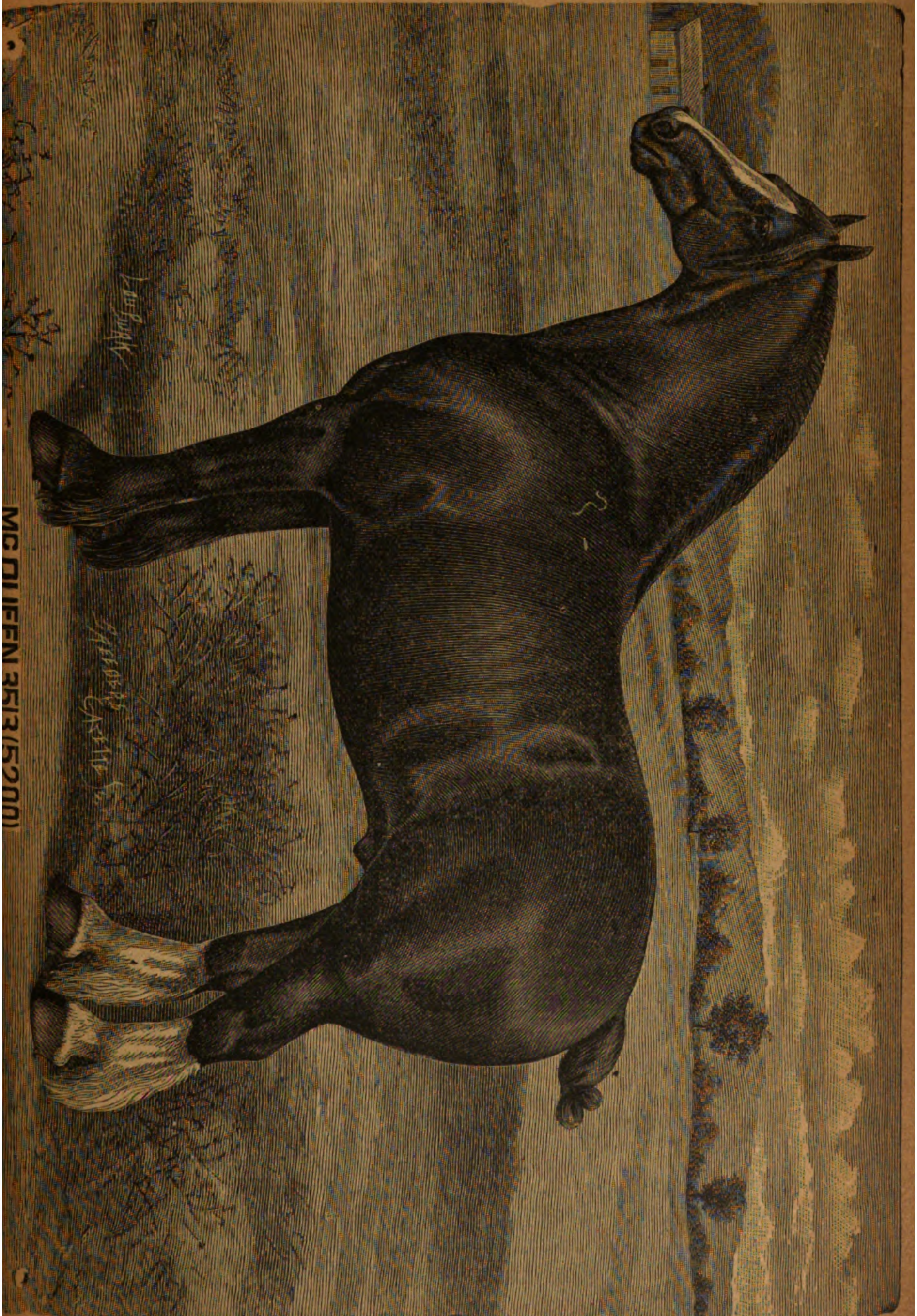
The Percheron.—Certainly, with our peculiar methods of doing business, neither of these horses is adapted to our uses; but there is a breed of horses that fully meets the requirements of our people, and that is the quick, active Percheron. Although English and Scotch horses have been much the longest on the market, the Percherons have completely superseded them in popular favor, as is shown by the unimpeachable evidence of nearly all the city buyers, verifying the oft-quoted saying of the great Talleyrand, that "nothing succeeds like success." Charles Du Hays, the veteran French equine historian and master of the horse under Napoleon III, says of the Percheron:

"To no ordinary strength, to vigor which does not degenerate, and to a conformation which does not exclude elegance, it joins docility, mildness, patience, honesty, great kindness, excellent health and a hardy elastic temperament. Its movements are quick, spirited and light. It exhibits great endurance, both when hard worked and when forced to maintain for a long time, any of its natural gaits, and it possesses the inestimable quality of moving fast with heavy loads.

"It is particularly valuable for its astonishing precocity, and produces by its work as a two-year-old more than the cost of its feed and keep. Indeed, it loves and shows a real aptness for labor, which is the lot of all. It knows neither the whims of bad humor or nervous excitement. In the Percheron, we recognize the heavy Arab, modified and remodeled by climate and peculiar circumstances. He has remained mild and laborious, like his sire. He is brought up like him, in the midst of the family, and like him, he possesses, in a very high degree, the faculty of easy acclimation. He acquires this, in the midst of the numerous migrations in the Perche, the counterpart of those that the type-horse makes upon the sands of the desert. A final comparison, which, perhaps, has not been sufficiently noticed, is that, like the Arab, he has no need of being mutilated in order to be trained, managed, and kept without danger. In a word, the Percheron, notwithstanding the ages which separate them, presents an affinity as close as possible, with the primitive horse, which is the Arab."

Professor Andre Sanson, of the National College of Agriculture and National Institute of Agriculture of France, says:

"The Percheron is a draft breed of the most superior quality, and for this reason it enjoys an enviable reputation. It possesses an active, quick, energetic temperament; the right one to pull heavy weights at a rapid gait. Fast steppers are common in this race. Before the establishment of railways, it was this breed that was used for our stage coaches and diligences. Now-a-days it is used more than any other for



THE MATCHLESS McQUEEN.— Property of R. B. Ogilvie, of Madison. At two years of age, weight 1,800 lbs. McQueen was awarded 1st prize at the great show in Toronto, Canada, in 1887; 1st at the Wisconsin State Fair; 1st at the American Horse Show in Chicago, November 10th, 1888; also for the American Clydesdale Association premium at the same exhibition.

our omnibuses. Its great feature is rapidity combined with great strength. This is the reason why the Percherons are sought after by all the nations who are trying to improve their draft horses or to create a breed for themselves.

"Indeed the Percheron is one of the breeds that enjoys in Europe, and even in the whole world, the highest consideration. It has, on account of its incontestible merit, carried all over the world the fame of the little French province where its nearest center of production is to be found. This fame of the Percheron horse is only to be compared with the thoroughbred horse of England, for the Percheron is to the draft breeds what the English Thoroughbred is to the light breeds—a generator and improver."

Another noted French writer says:

"The Percheron is a breed that has been moulded to the necessities of the different periods of its existence for hundreds of years. Under the vivifying influences and climatic effects of the Perche, as well as by the inimitable processes of educating both males and females from the earliest age, and with the most judicious care possible, by the actual performance of the work they will be called upon to do during their lives; thus, slowly and surely developing their physical capabilities and instinctive aptitudes into hereditary and transmissable forces, which have been exerted with such prepotent power in the amelioration of all races with which it has come into contact."

The Percheron to the Front.—The Clydesdales and Shires were imported to this country and Canada, many years ago, but the demand of our people for a horse of equal substance and bone, and more activity, caused the Percheron to almost supersede the British breeds, as is shown by the evidence of the accumulated knowledge of years of experience of those who perhaps furnish 40,000 of these horses annually to the people who wear them out.

Bahlman, Murback, Chamberlain, Oakly & Smith, Hayman, Stein & Co., New York, Newman & Ritchey of Brooklyn, Heineman of Mansfield, Ohio, Henry, Newgass, Cooper & Lamb of Chicago, all state their emphatic preference for the Percheron. They say they are possessed of more endurance than any other breeds, give good satisfaction, and wear well; have better feet; last better on our pavements, and are more easily acclimated than any other breed. This is not the evidence of men handling one or two horses, but men who handle thousands annually.

Ten Thousand Imported.—Ten thousand pure-bred Percherons have been imported in a very few years, and although a number of English and Scotch horses have recently been imported, but few of the produce of later importations have had time to go upon the market, or in any way demonstrate that they are superior to the English and Clydesdale horses bred in this country years ago, and which were displaced by the Percherons. The British breeds are perhaps suited to the British people, and their British ways of doing things, but, as I remarked before, there is not a slow pulse in an American, and he don't want any slow pulses in his horses, and this will be more and more felt as you breed up. As the mares become larger, the more necessary it will be for you to cross them with strong, active stallions; otherwise, you will, in a short time, possess a heavy, clumsy race of horses, fit, as Youatt says of the Lincolnshire black, only for parade and show. If you want a quick, active worker, one that can do a day's work and come up smiling at night, breed your mares to the Percheron.

Discussion.

QUESTION.—What horse do you breed principally?

MR. THOMPSON.—I am Secretary of the Percheron Horse Breeders' Association and the French Coach Horse Association, and represent a number of breeders who breed those horses.

MR. GORDON.—What is the difference in weight of the standard-bred Percheron of forty years ago, and that of to-day?

MR. THOMPSON.—They are breeding them much larger. It is a mistake that is being made. You have a big horse weighing 2,000 pounds with less activity, and you can't help it. Forty years ago the horse of the Perche would not weigh more than 1,500 pounds.

MR. GORDON.—Wasn't it owing to the demand from America for a large horse that has caused breeding in that direction?

MR. THOMPSON.—That is the only reason, sir. The demand for the heavier horses in America has caused them to breed heavier animals, and I think it detracts from any breed if you make them too large.

MR. VAN DUSEN.—Isn't it your judgment that that demand is going to see its best day very soon, and that we are going to come back to the 1600-pound horses?

MR. THOMPSON.—I think that people will soon see the error of breeding to 1,900 and 2,000-pounds-weight horses.

PROF. HENRY.—What do you consider the best weight for draft horses?

MR. THOMPSON.—We have bred up these horses from very small ones. We have a lot of good-sized mares here now, and a 1,700 or 1,800-pound horse is fully heavy enough to cross on any of them.

MR. MCKERROW.—Isn't it true that a team of first-class quality, weighing 3,000 pounds, will sell equally well with a team 400 pounds heavier?

MR. THOMPSON.—They will sell more readily on the market.

QUESTION.—Is there any difference between the Percheron and the Norman?

MR. THOMPSON.—There is no significance in the term Norman as applied to the French horse in France. There is no breed known there as Normans. Some of the earlier importers, either through ignorance or something else, called all breeds of French horses Normans. As a matter of fact they are called after the district in which they are bred. These people went over there and bought some in Normandy and called them Normans.

THE FARMER'S HORSE.

By JOHN M. TRUE, Baraboo, Wis.

The Horse the Markets Demand.—The profitable horse for the farm must combine a good degree of adaptation to the required farm work, with qualities that demand recognition in the best markets. A small proportion of the horses produced on the farm are required for continued farm labor, but it is a fortunate fact that the best and most reliable markets call for such horses as may be produced from a class of mares best adapted to the diversified wants of the farmer. No clear-sighted breeder will be contented to raise the animal that in common parlance is denominated the general-purpose horse. He is a compromise between the two types that are required to furnish three-fourths of the market requirements, and fails to give, in any considerable degree, the distinctive merits of either. The idea that the horse that at maturity will weigh from 1000 to 1300 pounds, possessing a semi-draft, semi-roadster formation, but wanting the weight of the former and the style and action of the latter, is a typical horse for the farmer to breed is a delusion and a snare. This idea has sacrificed the best available blood in the country, ignored the demands of the best markets, and filled the land with unsalable, because undesirable, stock.

Appreciation of the Morgan.—Had that appreciation of the grand old Morgan that now seeks to gather up and strengthen the scattered remnants of that family, found proper expression and action fifty years ago, much valuable effort would have been spared, and a well defined and valuable breed of horses, peculiarly American, would now be in our hands. But blind to the requirements of the principles of breeding, by illy-advised crosses, even in the original home of this now much prized horse of our fathers, very few animals are now found possessing strong indications of the old Morgan stock.

In the Way of Successful Work.—This same disposition to mingle bloods, to ignore line breeding, and to cater to the general-purpose idea stands squarely in the way of the best results with the average farmer of to-day. The cheap grade, the miscellaneously-bred scrub, and the little roadster sire debars the horse-breeding farmer from successful work. With indifferent stock now on his hands, the future holds out no inducements to his misdirected efforts. The only financial idea that his mind seems capable of grappling with, is the difference between five and twenty dollars in the price of the service of the sire. He is blind to the fact that his neighbor readily sells his surplus stock for twice the money that he vainly seeks to get for his own. He does not realize that it costs as much for him to raise his unsalable product as it does his neighbor to mature his better-bred colt, and fails to see that the difference in profit between them is merely the price of the intelligent thought and skill of his competitor.

Results of Systematic Work.—It is a matter of much satisfaction that systematic work is making rapid strides in developing and fixing the type of our grand American-bred roadster, and in the near future we may confidently expect that in this class speed, to a reasonable extent, may be as surely bred as form and weight in the draft class. This is being attained by a recognition of blood lines, and breeding from standard-bred sires and dams.

Breeding for Speed Only.—The general farmer will find little time and small inducements for engaging in this expensive and skilled department, where speed only is sought and other qualities ignored. This breeder and handler, like the horse he pins his faith to, if he makes a success of his work, must be "one in a thousand."

The Farmer's Roadster.—The combination of speed, style and weight, so often found in the roadster stallion of the present, gives us an animal entitled to the careful consideration of a class of our farmers. A standard-bred roadster stallion of superior style and finish, and weighing in proper condition 1200 lbs. or upwards, is a grand acquisition to a community of discriminating farmers. From such a sire, and well-bred clean-limbed, good styled roadster mares weighing 1100 lbs. or more, a class of colts should be produced that will always be in demand for carriage work in our cities, as well as adapted, to a certain extent, to the wants of a class of our farmers. In many parts in our State I find a large number of mares good enough to breed roadsters or carriage horses from, while in other parts there is almost a total lack of such material. The attempt to breed roadsters from grade draft mares should be discouraged. The farmer's roadster should have form, size, style and sufficient speed to render him an attractive, pleasant driver, though a 2:40 "clip" is less important than a "trappy" movement necessary to perfect the stylish driver.

The French Coacher—Is strong in the desirable points of the carriage horse. In attractiveness of form and movement he is a remarkable exhibition of the skill and intelligence of French breeding that first gave us the Percheron, and now with the additional Coacher promises to fill the measure of the requirements of the American breeder to a remarkable extent. He only needs to establish his power to transmit his excellent qualities when bred upon our mixed-bred mares. No animal can displace the draft horse from its strong position as a horse-motor in the work department of the civilized world.

The "Big Horse" Industry.—Regardless of misrepresentation, ridicule, and a general lack of appreciation, the "big horse" industry in our country has within the past ten years outstripped any other live stock venture in importance and financial success. Remarkable as has been the development of this work, equally remarkable has been the constant and undiminished demand for its product. A complete revolution has been effected in the scale of weight in our work horses. Where, ten years ago, 1200-pound horses were tolerated, now 1400 or 1600-pound animals are required, while greater weights command larger prices. The farm, the mines, the lumber woods, and the cities, call for such horses as can be produced by crossing our strongest, heaviest-boned mares with full-blooded draft stallions. These grade colts are raised as easily and surely as steers, make the best of returns for feed given, are orderly and easily handled, and susceptible of early maturity. When, at three or four years of age, they go upon the market, they give a percentage of profit equal to any stock investment on the farm.

Good Prices Obtained.—The strong point in the heavy horse industry is the uniformly good prices obtained in the aggregate of sales. The brood mares best adapted to the production of heavy colts are those best suited to the largest requirements of our farm work. Indeed, the grade draft weighing 1400 pounds comes nearest to my ideal of a farm horse. The farmer's mare may be, then, the animal fitted for the performance of farm labor by formation and size, and may also combine qualities that, when she is judiciously mated, will produce colts that are in demand at highly remunerative prices.

The Degree of Success.— The largest profit clearly lies in raising either carriage or draft horses. The degree of success will be dependent upon the adaptation, intelligence and skill of the breeder, manifest in his judicious choice of the line of horses he will breed, the careful selection of sires, and the proper handling of breeding stock and colts. It is fortunate when communities of farmers can unite in raising the same kind of horses, as by the number and uniform quality of the stock offered, buyers are attracted and better prices are obtained. I have endeavored to show that my farmer's horse is not the mythical general-purpose nag. The horse market is not exempt from the general conditions which, with a close competition, surround all our farm enterprises, and in common with other lines of work, success lies only in the path of intelligent, persistent work, that will place our product beyond general competition by virtue of its excellence. So the farmer's horse must be bred for a special purpose, and that purpose the putting of the most possible money in the pocket of the owner. The poorest results, in individual cases, that may come from such work will still be superior to what may be expected from the thoughtless and penurious methods of the past.

RAISING SHEEP FOR MUTTON.

By GEO. McKERROW, Waukesha, Wis.

A Wide Range in Prices.—If you have noticed the mutton markets for this past six or eight years, as I have done, you will notice that the range of prices quoted in Chicago, New York and other markets has been widening. During the past winter sheep have sold in the stock yards at Chicago, all the way from $2.00 to $7.00 per hundred.

Now, is it the Merino sheep that are bringing this seven dollars per hundred? I answer, no. The best lot of Merino wethers that I know of sold in Chicago at about five cents a pound, while I know of two at least, if not more, lots of grade mutton sheep that were sent in from the State of Wisconsin, that have sold for over six cents per pound on that same market. I believe in breeding to a purpose, but as a dairyman breeds up his herd to a Jersey or Guernsey or Holstein standard, so the sheepman can grade up his sheep toward a Downs standard or a long wool standard.

Sheep Giving Good Results.—I meet many sheepmen, and men who are following diversified farming, who have sheep and cows and horses and hogs, and they all tell me that the sheep are and have been giving them as good results for the past two or three years as any of their other stock. I know of but one experiment that has been tried on this side of the Atlantic to find out how cheaply mutton could be produced, and what profit there was in producing mutton, and that was carried on at the Ontario Experiment Farm, under the direction of Prof. Wood, for a period of five years. He experimented with all the pure-breeds; but to bring it down to the practical farmer of Canada, he took the common sheep of the country and gave them one cross with these pure-bred animals, feeding them until they were a year old, pasturing them and selling the carcasses. He did this for five years and then balanced accounts. Following is a summary of the accounts:

The Half-Blood Southdown—Cost six dollars for its keep, and this included all the items, the shepherd's care and the use of the mother, over and above what her fleece brought in for the year previous. Every item was reckoned in, so that this six dollars is the actual cost of keeping that sheep until he was sold, which was at a little over a year old. It shore six pounds of wool, bringing $2.40. Its carcass weighed 147 pounds, live weight, and it sold at 6½ cents a pound, bringing $10.20, and giving a total profit of $6.60.

The Half-Blood Shropshire — Cost $7.00 to keep, shore nine pounds of wool, which sold at 38 cents a pound, bringing $3.40. It weighed 160 pounds, live weight, which sold at 6 cents a pound, making a net profit of $6.32.

The Half-Blood Oxford—Cost $7.40 to keep, shore eight pounds of wool, which sold at thirty-five cents per pound, bringing $2.80; weighed 177 pounds, which sold at six cents per pound, bringing $10.62, or a net profit of of $6.02.

The Half-Blood Leicestershire — Cost $8.10 to keep, shore eight pounds of wool, which sold at twenty-eight cents, bringing $2.24; weighed 198 pounds, which sold at five cents per pound, bringing $9.90, or a net profit of $4.68.

The Half-Blood Merino—Cost $5.50 to produce, shore seven pounds of wool, which sold at forty-two cents per pound, bringing $2.94; weighed 145 pounds, which sold at five cents a pound, bringing $7.25, giving a net profit of $4.04.

The Common Grade.—The native which was tried side by side with these, cost $5.00 to keep; it shore five pounds of wool, which sold at twenty-five cents per pound, bringing $1.25; weighed 150 pounds, which sold at five cents per pound, bringing $7.50, a net profit of $3.75.

The Half-Blood Cotswold — Cost $9.31 to produce, shore nine pounds of wool, which sold for twenty-eight cents per pound, bringing $2.52; it weighed 199 pounds, which was sold at five cents per pound, bringing $9.95, giving a net profit of $3.17

You see by these experiments that all these sheep paid a profit, and a handsome profit. You can draw your own conclusions regarding breeds. You will see it was not the heaviest shearing sheep that produced the most profit; so there are more things than the weight of the wool or the carcass to be taken into consideration in settling upon a sheep breed.

Mutton Produced at a Profit.—On this side of the line we can produce mutton at a profit. If you will figure out the cost of some of this mutton, as I have done, you will find that the lowest cost at which any of this mutton was produced was two and two-tenths cents per pound. If we can raise mutton here in Wisconsin at that price, and sell it at six cents per pound, which it has readily brought in Chicago the last year, we are making a good profit.

I, for one, would just as soon try to raise wheat, oats and barley for the straw, as to endeavor to raise sheep for the wool, under existing conditions.

Profit In Early Lambs.—I have some Oxford lambs that were dropped the first week in March, averaging, I think, about twenty-three or twenty-four days old, which weighed, just before I came here, from thirty-two to thirty-three and a half pounds each. The Shropshire lambs are a week younger and weigh from twenty to twenty-two pounds; the Southdowns about the same. As to the breeding qualities of these sheep, I will say we have thirty-eight ewes, and beside them are fifty-four lambs doing well and thriving nicely. I don't know what those lambs are worth now, but lambs that will weigh forty pounds the latter part of March and the first of April have sold readily in our part of the country, other years, to Milwaukee butchers, at from $3.50 to $5.50, and sometimes even a little more.

Money in Raising Mutton.—I believe it is possible for the farmers of Waukesha County to make some money out of raising mutton, but I believe that we must raise the standard of early maturity just the same as beef producers and pork producers raise it. I believe we cannot do as we used to do, keep a wether until it is three years old and make his fleece pay for his keep, because every year that we keep him he is going in debt to us, and when we sell him we have to make that up, and it doesn't leave much; but if we will feed from two to fourteen months there is a profit in a well-bred and well-fed lamb.

Discussion.

MR. GORDON.—How can you make the American eat more mutton?

MR. MCKERROW.— Give him better mutton. There is a gentleman sitting in this room who told me he used to be a Merino man and he didn't like mutton. Last summer he got a taste of Down mutton, and he ordered the butcher to bring some more of that kind, and he said he couldn't; there wasn't enough in the country.

MR. FLEMING.—Do you think washing wool on sheep practicable?

MR. MCKERROW.—No, sir; I think they should be shorn unwashed.

MR. CLINTON.— Is it possible to pursue sheep husbandry as a specialty on land worth $100 an acre, and get a decent living, either for wool or mutton, or both?

MR. MCKERROW.—I think it is. These experiments I have just read show that there was a clear profit of $6.00 and over per head made on three of those half-bloods. Allowing six sheep to the cow, your profit at $6.00 per head would be $36.00, clear.

MR. HIRAM SMITH.— That was five years ago. At the price wool and mutton are selling for now, would it leave that margin?

MR. MCKERROW. — Good mutton is selling for more in our markets than it was six years ago.

MR. SMITH.—Could you get a living on an eighty-acre farm with sheep?

MR. MCKERROW.—I would be willing to try. I was speaking, however, of sheep raising with mixed husbandry.

QUESTION.— Do you let your sheep have access to salt at all times?

MR. MCKERROW.—Yes, always.

MR. AINSWORTH.—Which will cost the most and which will be worth the most, two Merino sheep that will shear twenty-five pounds of wool, and weigh one hundreds pounds apiece, or one coarse-wool sheep that weighs two hundred pounds and shears eight or ten?

MR. MCKERROW.—Those two hundred pounds coarse-wool sheep generally shear more than that amount of wool, to begin with. I can show you flocks that will average over twelve pounds of wool. I believe I can make as much money out of the large sheep that will raise two good mutton lambs that will give me ten dollars, and if your Merino will raise one I think she is doing pretty well.

POULTRY ON THE FARM.

By REV. J. E. TURNER, Sussex, Wis.

Progress in Fifty Years.—The poultry interest of this country has scarcely kept pace with the progressive age in which we live; yet wonderful progress has been made in the breeding and management of poultry in the last fifty years. To-day thousands of chicks are hatched and reared by water and steam that never hear a mother's cluck. In an American poultry book, published in 1843, we find there were but few—not more than one dozen—distinct breeds of poultry known. Now in the American Standard of Excellence there are nearly 100 different distinct varieties of land and water fowls recognized. Now we have a great variety of incubators, brooders, artificial hatchers and mothers, that relieve biddies largely of weeks of monotonous sitting, brooding and rearing little chicks. One man in our own State (F. G. Underwood) runs a hatchery of 10,000-egg capacity, hatching thousands of chicks at one sitting, and rearing them for market.

An Important Industry.—The importance of poultry on the farm in this country must not be overlooked. Its production shows it to be one of the most important American farm industries. Flocks of fowls are reared on town lots in our cities and villages quite extensively—in some instances at the rate of 2,000 or more to the acre in a season. A few fowls are kept by the day laborer to supply his table with fresh eggs. Every farm, if containing only a few acres, has its flock of poultry, large or small.

Keep Profitable Fowls.—The farmer considers farm stock important only as it yields him a fair income on the capital invested. The horse must do good service on the farm or sell for a good price, or he is unprofitable. The cow must produce a fair amount of butter, or your dairy farmer will not have her. Sheep must produce a fair amount of good wool and raise good lambs or the sheep farmer will not have them. Hogs must fatten easily, on as little food as possible, or the pork-raiser will not feed them. So if poultry yields no eggs, meat or feathers, you don't want them on your farm, even if they do scratch their own living. Hence, poultry fanciers at our fairs are constantly asked: "Are these chickens good layers?"

Poultry on a Large Scale.—Poultry is important if one considers it as farm stock for profit. There are men who have made large sums of money producing poultry and eggs. James Rankins, Southeastern Massachusetts, runs a duck farm of a capacity of 10,000 ducks per annum, or 50,000 lbs. of ducks, which bring him from $10,000 to $15,000. He has said that a duck can be made to pay more than a cow. He has a large dairy farm, too.

A. C. Hawkins, Lancaster, Mass., has the largest poultry farm in the world. He keeps from 2,500 to 5,000 breeding hens, and raises from 10,000 to 12,000 chicks annually. His sales from eggs in 1885 amounted to $15,000, 90 per cent.

of which was profit. Then, he sells large numbers of fancy breeding poultry.

One man in this county tells how he made $1,276 out of poultry in 1885. He says his poultry paid him better than all other farm stock, all things considered.

At Lochsberryville, Pa., is a famous egg farm—Pennsylvania Incubating Co.—consisting of not more than an acre of land devoted to chickens. The buildings cost $4,000. The manager is a boy, who does all the work. The profits for a year from 625 hens were $1.00 per hen on eggs alone, after deducting those used for hatching purposes. The total profit on eggs and fowls was $1,680, on an investment of $4,000.

The poultry farmer is often sneered and laughed at, if he exhibits a little enthusiasm in his business, yet the poultry and eggs consumed in New York City alone, in 1884, was as follows: Dressed poultry, $25,000 worth; eggs, $10,000 worth; total, $35,000, and, with all these large figures, poultry is about the only product we do not send abroad, but market entirely at home. France and England send large quantities of eggs to this country, and receive a ready market for them. China furnished America in one year, 1,000,000 dozen of eggs. In 1882 we received 13,000,000 dozen eggs from foreign countries; still we were not satisfied. Poultry outranks any other single product raised or sold in this country; yet many think it is a small business—that only men of small intellect are fit to engage in it.

Actual Profits.—But as to actual profits: One says his profit was 300 per cent., and another 90 per cent., another 500 per cent. In a report of 10 farmers, keeping from 10 to 120 common fowls, 500 in all, a net profit is realized of $2 per head (1.98), making a profit after deducting 50 or 60 cents each for cost of fowls, of about 400 per cent. If 10 farmers can do that, why cannot many more do the same thing? Making large allowance for extra care and feed, there is still a profit of 100 per cent. to 300 per cent. in poultry and egg production on the farm, which shows conclusively that it is a profitable business, hence important to farmers. The fancy poultryman, like the fancy stockman, finds the business still more lucrative; reaps very large returns, often, for money invested.

Money in Broilers.—The broiler poultryman, too, like the sheep-raiser who raises early lambs for market, finds a very large profit in raising broilers that weigh from ¾ lb. 2½ lbs. each, to be sold from March 1st to June 10th. This class of poultry brought in the Chicago market in 1886, from March 3 to June 3, from $5 to $10 per dozen. The cost of a chick until 10 weeks old is estimated at 10 cents, or $10 per 100. At a low price—25 cents each—it yields a profit of 60 per cent. At Chicago prices, 40 to 80 cents each, the profit is 120 to 240 per cent., not such a poor profit after all. Farmers don't generally realize such figures out of their farm products.

Requisites of Success.—But we are told all poultry farmers do not make such a success with poultry generally, as has been made in the instances given. Do all farmers make the same success out of any particular farm product or stock? Certainly not. It depends largely on skill, talent and the interest taken in any farm product, as to what success will be achieved in it. If one don't like the poultry business, takes little interest in it, letting his poultry look out for themselves he must blame himself, not the poultry interest, if it is a failure.

Important Points—In conclusion, let me say: 1. Put up suitable buildings for the business, not the same as you would for horses, cattle or sheep, but such as meet the wants of poultry in summer or winter. 2. Get some one of the fine breeds of American poultry, so that if any are wanted for breeding purposes you can supply the demand at good prices. 3. Take care of them as you would other farm stock; they will bring you as good returns, some say better, than you get from most other stock on the farm.

A large amount of poultry raises itself, scratching its own living, roosting wherever it can find a little shelter. The farmer says it pays about as well as anything he raises on his farm. Surely there is a great saving in poultry on the farm for a little needed attention to its wants. Fowls will gather up and make profitable what would otherwise be wasted. The possibilities and importance of poultry on the farm, when rightly considered, are very great. It is high time that farmers gave this interest the attention that it justly deserves.

LIFE ON THE FARM.

By MRS. H. H. CHARLTON, Brodhead, Wis.

How Opinions Differ.—A farm may mean so much or so little, and life means such widely separated things to different individuals! Yet there is a common ground. To each mind it means life away from the city or the village; it means tilling the ground and living by the fruit's thereof. To one man the words open an interminable vista of long days of hard work, rising before sunrise and toiling after sunset; of work without leisure, of plain clothes, little cash and less pleasure.

To another they mean long days of communion with nature, as following the plow he notes each hint of the coming glory of the spring-time, the soft and varied hues of the trees with buds just swelling or bursting into blossoms, and the sudden changes of light and shadow—days as glorious as the radiant dawn with which they begin, as peaceful as the soft, gray twilight which brings them to a close, because health and strength attend his steps; days spent not amid the whir of machinery, nor amid jostling crowds, in the close and stifling atmosphere of shut-in city walls, but out under the broad expanse of heaven where the silence is broken by the song of birds, the drone of insects, by the rustling of leaves and the sound of loving voices; days of glorious liberty when he treads his own soil, cares for his own property and follows the dictates of his own will.

They mean long breaths of clear, pure air; long drinks at the cool, refreshing spring; they mean the woods redolent with the perfume of flowers and fruit, or the same woods in winter when through the interlacing net-work of boughs he catches glimpses of the blue heaven above, and the ringing song of his axe keeps time to the psalm on his lips; they mean comfortable clothing for the body, and rest for the soul, freedom from all the entanglements of politics and the tricks of trade, the freeman's true independance of thought and action.

Some such vision as this dimly outlined rises before the man who is truly called to the vocation of farmer. He sees clearly the work in it, but he does not fear it, for it is work under conditions he loves, and there can be no real living for the honest, healthy soul without work. He who seeks to live in city or country without work of some honorable sort belongs to the class of beggars or thieves.

Dislike for Country Life.—But all people do not see these things alike. In a group of ladies gathered at an afternoon tea, a young lady remarked:

"I heartily despise farms and farmers; everything indeed connected with farming."

Silence fell on the room, and a conscious blush rose to the face of every person present. At length some one said:

"I was brought-up on a farm, and I cherish the memory of my childhood's home. My parents stood high in community, and although my later days have been passed far from farm scenes, I do not know that I am to be the more respected for that."

The conversation following revealed the fact that all the older people present were born on the farm, and some of the younger ones. The young lady herself had spent her childhood on the farm, and the first wealth which flowed into her father's coffers had come from the rise in the value of his farm lands. She apologized for her ill-considered remark, but added: "I do not like country life." For this she was not to blame. She had been educated to think that life in any village or city was preferable; that the end of life on a farm was to get money enough to get away from it; and she showed only the weakness of ordinary human nature in despising that which she had made a stepping-stone to something she deemed better. Her mistake, and that of her parents, was the common one, that great possessions indicate success in life, whereas, a man's life is to be measured, like the life of the tree, by the growth it has made. We are all prone to forget that it should be our purpose not so much to obtain as to attain, for in the life beyond the grave our worldly possessions will avail us nothing, while any mental and moral worth we may have acquired will still be ours.

Educational Advantages.— But the city offers the best advantages for education! Perhaps so, if by education you mean a knowledge of books, and acquaintançe with the achievements of art and science. But amid the multiplied trophies of the intelligence and handiwork of man, one is apt to lose sight of a higher intelligence in admiration of his own. The pursuits and occupations of the present hour absorb him, and become to him the highest good. The finger of omnipotence is constantly writing its lesson of infinite love and wisdom; but it writes it not on the brick walls and stony pavements of the city. You will find it written on the hill and stream, on the sunny meadow and in the sheltered groves; on the mountain top and in the forest glade; on field and wayside.

In the city library you may read the thoughts of great men, and be helped thereby; in the country you may read the thoughts of God, and with your ear close to nature's heart you may learn of infinite love.

Who Works in the Dirt?—"Don't talk to me of country life," says one, "I can't endure working in the dirt or walking in the mud. I like to live where there are side-walks and things are kept clean." Who works in the dirt? Not the farmer, for his work is amid living, growing things. He works not in the dirt, but in the soil, that wonderful loom where nature weaves the sunshine and the dew into form and color. Call the grease and grime of the machine shop, the dust and fuzz of factories and stores dirt, if you will, but not the soil which gives back to man the smile of God in grass and flowers. The farmer would never set out a plant in the dirt, for it would only die, and his labor would be lost; but he breaks the surface of the ground, he stirs the soil, and to its warm and mellow depths entrusts the seed which shall return to him golden harvests.

A little country training would teach you to know soil from dirt, my friend. Would you see who live and move and revel in dirt, follow some of the filthy city side-walks out into the by-ways and alleys. The poorest farmer in the poorest hovel ever called a farm-house has kingly quarters compared to the inmates of the swarming tenement house, for all around him are light and air and sunshine. He knows the scent of wild flowers, and the color of a June sky. Scavengers may clean the city streets of their filth every night, but the springing turf upon which the farmer walks, wet with the evening dew, is fresh each morn and sparkling with a myriad of gems.

The Most Comfort in the Country.—Why is it when we speak of farm life that we always picture to ourselves the hard worked farmer, and when we speak of city life there arises before us a picture of gayety and ease, of handsome horses, elegant carriages, brilliant assemblies and costly raiment. We measure one by its narrowest limitations, the other by its widest possibilities. Yet life for the mass of mankind in country or city means constant labor, and the same diligence will insure more real comfort in the country than in the city, if we look below the surface of things. Measure both by the same standard, and let that standard be the best opportunity for physical and spiritual growth, and the balance is in favor of the farm.

Moral Worth and Mental Culture.—True, frequent association with others quickens the intellect and gives to one an ease of manner attained in no other way; but these are often superficial, and not always indications of moral worth or mental culture. I remember a vine in my father's garden which bore clusters of grapes of unusual size and beauty. Tempting, indeed, they were to the eye in their purple coloring, but oh, so sour to the taste, for in the longest season they never seemed able to gather in enough sunshine to perfect and sweeten them! Climbing on the same arbor was another vine whose clusters were straggling in appearance, and the grapes small by comparison; but I have plucked and eaten them with delight before the sun had given them scarce a tint of ruby color. The former ripened from the outside in, and took on all the bloom and beauty of perfection while still immature; the latter ripened from the inside outward, and had all the richness and sweetness of maturity while still appearing green. Need I say that the perfect character must ripen from the heart outward, and that otherwise all outside polish of manner is worthless.

A Good Book of Etiquette.—There is a book of etiquette which all may possess, the following out of whose precepts will give a charm to both mind and manner, of which the polished grace of city drawing-rooms is too often a mere imitation. It counsels as follows: "Be courteous; be kindly affectioned one toward another, in honor preferring one another. He that ruleth his spirit is greater than he which taketh a city." The very acme of culture is self-control; the secret of all true politeness is forgetfulness of self, and grace of manner may flourish in the plainest farm-house as well as in the palace—aye, flourish more abundantly, because more likely to spring from the soil of sincerity. Churlish people may decide manners, but everywhere in life the old maxim holds good: "Politeness is to society what the cushion is to the rocking-chair. It adds nothing to its strength, but makes it more comfortable."

A Mistaken Idea.—But, says one, farm life is looked down upon. We are a young nation, and do not yet rightly measure the sources of our power nor properly estimate that sovereignty of the people which is our constant boast. Proud of our self government, asserting on every side our independence, we forget the first principle of that personal liberty for which our fathers fought, and cling to the traditions of the old world as if they were the legacy the pilgrim fathers fled to this country to preserve. The word farm means a piece of land set apart for a tenant, and when a lord owned the land and all who tilled the soil were his dependents, warring or keeping peace at his will, farming may have been an occupation below par; but in this land, where our fundamental doctrine is that all men are born free and equal, where the lord of the manor is himself the tiller of the soil, farming is lifted to the highest place among all occupations—to it, in effect, all other occupations bow. Art enobles it, science aids it, literature crowns it. How long shall we, forgetting all the dignity of the freeborn citizen, forgetting all the rights of humanity for which the race has struggled from *Magna Charta* until now, go on talking about looking down upon farming.

The Farms the Nation's Wealth.—We boast of being a nation of homes. The little farms which dot the landscape are, indeed, the nation's wealth. Our agricultural interests far outweigh in money value the commerce of the country.

What Thought Has Done.—In every direction thought has been given to lessen the labor and increase the profit of the farmer's toil. Here is costly and complicated machinery which cannot be trusted to the ignoramus; the man must be intelligent who can properly use and care for it. Here are high-mettled thoroughbred horses which must be exercised, fed, watered and groomed with much more care and thought than the average parent gives to his children. Here are imported cattle which must be tenderly treated, housed warmly and fed properly. Time and attention has been given to devise the best plan for a barn, the best method of training a horse, the best way of preserving feed for winter use; to ascertain the proper temperature of drinking water for cattle in winter, and the best and cheapest ration of food. Last, but not least, the commonwealth is turning its attention to the farmers themselves. State universities have opened agricultural departments, as it has come to be recognized that farming is a learned profession. Indeed, so vital to the interests of the Republic is agriculture that it has, what no other single vocation can boast of, a special representative in the cabinet of the president of these United States. Can honor, father, go? Who will talk now of looking with contempt on farming? Did not our own State show its appreciation of the fact that its own prosperity went hand-in-hand with the prosperity of the farming community when it established these Farmers' Institutes? Formerly the school teacher "boarded round;" now the farm school passes round from county to county, answering questions, arousing thought, and diffusing needed information.

But the nation and State may do what it will—the dignity and beauty of the vocation will depend upon the character of those who follow it. Ignorance and carelessness will depress it; learning and faithfulness will uplift it.

The Farmer's Home.—As the farmer looks over his fertile lands, and ponders on the hard cash the growing crop will bring, let him remember that the farmer's home is as much an index of the man as that of the banker and lawyer. Let him take a little time from growing crops for money to make his home beautiful. A well-kept lawn, a thrifty garden, fruit ripening in the sun, flowers nodding to the breeze, vines clinging to the casement, are more truly the birth-right of the farmer than of his wealthy city neighbor. If the latter will spend his money for these things, shall not the farmer spend a little money to obtain them? In the farm home, too, should abound that love and sympathy that fills out the joy of childhood; that healthy literature which will tend to develop the noblest character, for the farm home is the recruiting station for all the high and noble vocations.

As agriculture is the sure foundation upon which the prosperity of our country must depend, so is agricultural life the key-stone of the arch of our civilization. Rough and unpolished it may now be, but it shall yet be fashioned into glorious beauty by the hands of a pure patriotism. Around it shall cluster not only the flowers of nature but all the bloom and beauty of varied culture, and farm life in this Republic shall challenge the admiration of the world.

THE COMING FARMER.

By REV. C. E. GORDON, Koshkonong, Wis.

He is Coming—From our agricultural schools. One can hardly measure yet the value that the agricultural college, the experiment station and the work-shops and forges at Madison, and elsewhere, are to be to this race of coming farmers. I remember going back to the old world a few years ago and finding a mighty change in the farming interests of England; finding the farmers who used to be pretty well off poor; finding that it is very difficult for the English or Scotch farmer to get a living, but finding, all about the country with which I was familiar, men who were doing well and getting rich; men who had studied in the English Experimental School and in the German schools. They are not only outstripping the old school Englishmen, who are getting poorer and poorer every day, but are making money and getting on.

From the City—Is coming the new school farmer. It is one of the most remarkable phenomena of this country that the best and most successful farmers—those who are doing most for agriculture and for themselves and other farmers—are men who have retired from city life to take up farming, sometimes at an advanced age. The city men are making, some of them, the very best of farmers. I found last year out in the far West, in Idaho and Oregon, a great many retired merchants, tired of city life, who were most successful farmers.

Average Farmer, Intellectually.—From those three principal sources, then, are we to look for this new school farmer. He is to rise out of the present position in which the farmer is placed. What is the average farmer to-day, intellectually? He is intellectually a man who inherits the carelessness, the slovenliness, the shiftlessness of the Eastern farmer of the last forty years, and of the Southern planter, with the terrible wastefulness of the Western grain-grower. Those three elements have combined to make a representative man all over these United States who stands before us as a typical farmer. He is a wasteful man; he is a shiftless man and a most slovenly man. Unfortunate it is, but still it is a fact, and nothing but the new light of such institutions as this; nothing but the new light that is to be thrown upon this whole farming question by the great movement for the improving of the condition of the farmer, is to raise him out of the condition into which he is sinking, slowly and gradually—almost into the position of the European peasant. It is a very sad thing to ride through these fields of Wisconsin and find them taken up by men a little better than peasants. It is a terrible thing to see the hills and valleys of New England covered by men little better than peasants; but the change is coming. We live in a virile and vital age, and the time is upon us when there is new life; when men who are now but little better than grubbers of the land, are to rise into dignity, and tillers of the soil be farmers in the true sense. The farmer is coming; he is pretty nearly here.

The Old School Farmer.—It would be idle for me to say anything more about the old and new school. We know that these old school farmers are men who sneer at everything new; who do a little this way and a little that way, and nothing in any particular way; men who sell all they can from their farms and return nothing to them; men who sneer at those, who, like my friend Mr. Smith, are fools enough to grow corn without ears and call it ensilage. The old school man works against all legislation for improvement. Last week we asked the legislature to pass a bill fixing a standard for milk, asking for three per cent. only of fat, and many of the farmers said: "What are we going to do with our cows, are we going to go home and kill them?" They thought three per cent. was too rich.

What Will the New Man Be?—What is the new man to be? He is to be a combination of the theoretical and the practical farmer. We can look back now and see the result of practical farming with next to no theoretical knowledge. We see the folly and the mistake and the mischief of this constant practice, practice, practice without the theory behind it. No, farming is a theoretical thing first, and then a practical thing, and the coming farmer shall be grounded in the meaning of the soil, in the word that the crops say to him about the laws of chemistry; in the meaning of the animal that he is to tend, in its functions, its peculiarities, in its wonderful powers of development. A man must be educated in the next twenty-five years not by the word of his father before him, but from the school of the farm, from the education of the university and of the training school and of the experimental farm, and all those agencies that go to make a man an intelligent man in his own profession. That is the education necessary to compete with the combinations that are to be against the farmers of the next fifty years. The old scratching of the ground might as well be done with the old Egyptian plow, and a woman harnessed alongside of the mules, as to be done in the way we are doing it now on a large number of farms. First, there must be the cultivation of the brain, then the cultivation of the hand, and then we shall have the farmer of the future.

Special-Purpose Farming.—Forty years ago the general store was all that was necessary. It kept a little molasses, a few groceries, a few boots and shoes and rubbers, and this, that and the other; but now we have a special store for the shoes, and a special store for the sugar and the tea and so on, the special drug store, and every other kind, and we are better served and hundreds are getting a living where one only used to get a living. So it must be with farming. The special-purpose has taken the place of the general-purpose store, and wherever you find a thrifty neighborhood in an agricultural community in the western part of this country you find following upon the heels of a general-purpose store, instantly a special-purpose store. So in farming, we must change from general-purpose to the special-purpose. The general-purpose farmer must give way to the special-purpose man—a man with the most earnest purpose to be a specialist in the position in which he is placed, A man cannot breed a few colts and a few sheep, and a little grain and a little milk successfully. It cannot be done any more than a man can do it in selling merchandise.

Land—Tools—Crops.—In Wisconsin we have offered to us, I think, about four things for the coming farmer. We have special-purpose land. A man who knows what he is doing will find land adapted to his work. We need special-purpose tools, that is, special-purpose machinery and buildings. They will be absolutely necessary to the successful farmer. We need special-purpose crops. I do not believe that a man who is dairying or a man who is raising beef has a right to think of raising anything on his farm that does not go through the stomach of an animal to come out as butter, or as a well-bred calf. Let us leave it to Siberia, the greatest wheat-growing country that the world has seen, to grow wheat, and let the dairyman raise such stuff as shall go through his cow and come out in butter.

Special-Purpose Stock.—Then, he needs special-purpose stock; that is absolutely necessary to the successful man of the future. I have read a great deal this last winter, and have been to many meetings of farmers, and have heard resolutions passed on the election of the president, and complaining of the railroads and this, that and the other, but I have yet to hear of a single resolution passed in any farmers' convention sending forever to the butcher's block, and to oblivion, the scrub bull. I tell you that the scrub bull in Wisconsin is a deadlier loss to the farmers than all the schemes of the railroads, than all the intrigues of politics, than all the disturbances in the social condition in the State in which you live. I tell you he is a deadly enemy, social and political. So I say, the coming farmer would no more think of having a scrub bull on his farm than he would think of introducing a scrub bull into his church.

Fruits for the City.—The special-purpose in Wisconsin, I think, will be, for the present, fruits for the city. We heard to-day that Wisconsin is admirably adapted for the growth of the delicate and delicious fruits that bring such tempting prices in the city. Then, it is one of the special duties of Wisconsin farmers and horticulturists to raise those fruits in their most perfect condition, and to make a specialty of doing it and marketing them in the best market.

Horses for City Use.—It is also one of the special businesses in Wisconsin to raise horses for city use. I do not believe it is the special business of the Wisconsin farmer to raise trotting horses for the country fairs. I do not believe it is possible for the average Wisconsin farmer to raise a decent horse for road purposes from the class of mares he uses upon the farm; yet I think that the special-purpose farmer can raise horses for city use—big draft horses from fancy draft horses; the best road horses from the best road stock. But the average farmer has no right to touch horse-breeding except he does it in a thorough and systematic special way, and horses can be raised in Wisconsin just as cheaply as anywhere in the world. We have a little shorter fall on the blue-grass and a little longer winter, but we have the best climate, the best land and the best water in the world to raise horses, and Kentucky men have told me that if we only chose to get the stock here, we could raise better horses than they can in Kentucky—horses with better qualities, sounder and better constitutions.

Hogs for Fine Tastes. — Then, of course, a most important purpose is the raising of hogs for fine tastes. I do not believe Wisconsin is destined to raise hogs for the lard pail; I think that belongs to the great southern belt. But to raise the fine hog for the fine taste, for a Deerfoot Farm Sausage, for the clean cut handsome ham, for the nice tasting breakfast bacon, for those things that bring a high price, it seems to me Wisconsin is admirably adapted for that purpose as a specialty.

Dairying for Profit.—Then, at last, we come to the great specialty of all—Wisconsin dairying. We are destined in Wisconsin to be the typical dairy State, if we only mind what we are doing; if we only guard carefully, by law and by injunction, our dairy interest; if we shut the door forever against Chicago fraudulent butter and Chicago fraudulent cheese; if we shut forever and keep always under foot the fraudulent cheese factories of our own State. If we can put our foot on these things that have, during the last twelve months, lost to Wisconsin $900,000 from the fall in the price of cheese alone, we will rise to be the leading dairy State of the world. We have every facility for it. We will have to protect ourselves against fraud, we will have to work earnestly with the best methods to produce fancy cream, and fancy cheese, and standard cheese and the best butter, to bring Wisconsin where she really ought to be to-day, and can be in a short time—the leading dairy State of the United States, and that means the leading dairy corner of this hemisphere.

The Farmer's Wife.—But the coming farmer will probably marry. He ought to marry pretty early, I think, if he can find anybody who will join him. I cannot say a word about the coming farmer unless I say a word about the farmer's wife. Familiar, as I am, with the squalor and misery of the city, the most pathetic misery of all, it seems to me, is often found in the life of the average farmer's wife. She sees her husband buy every tool to lighten his own labors; she sees him hire the help that is needed to aid him on the farm, and she is a slave of the oldest fashion. Her tools are the tools that probably were used at the time of the settlement of Canaan. Sometimes I go into farmers' houses and I see tools in the kitchen that, it seems to me, must date back to the time of Abraham; nothing new or convenient, while the farmer has his modern binder and reaper, his tearer and scratcher, and everything to lighten the labor of the land, and nothing to lighten the labor of the house. But the coming farmer is to provide his wife with every modern convenience to make her life just as rich and large and full and happy as his. She is to have co-operative washing, and save that terrible horror of Monday morning in cold weather, on the farm, where she has not a nice laundry and soapstone tubs, and hot and cold water. This is only a sample of what the rest will be. The farmer's wife is to be as good as he in respect to this matter of convenience.

The Balance Wheel.--So shall we turn once again to the country for the statesman, the soldier, the philosopher, even as we did in the early days of the Republic, before the fields of the East had been worn out by carelessness, before the plantations of the South had been ruined by shiftlessness, and before the magnetic attractions of cities had drawn the best blood of the farms. We shall again turn to the country to find there an educated, conservative, loyal constituency, which will be the balance wheel of the country.

THE NEEDS OF OUR PUBLIC SCHOOLS.

By H. C. THOM, Madison, Wis.

At the Bottom of True Progress.—Down at the bottom of all true progress in this great country of ours is the little common school. Seventy-five per cent. of our men and women go only to these schools, and it should be for your interest as citizens of Wisconsin that they should be lifted by your moral and educational sentiment to as high a standard as possible. The business men must have children who come from these schools, the professional arenas are filled with them. I tell you, my friends, the professions demand men who have girth of lungs and are broad shouldered, to stand the vicissitudes of life which are found in their ranks.

Trouble With Country Schools.—In my short experience with the country and with the city schools, my observation has taught me this: In the large cities we have spacious rooms, well furnished with every appliance to teach a child with, apparatus of every kind to hurry along his progress, while away out on the hillside, in the country, there is a little house that cost $600 (perhaps that is too high), furnished only with knife-eaten desks and an old dictionary with half the leaves torn out of it. We have in the country schools a set of teachers who come in in the fall and stay until spring. A new set come in in spring, and stay until fall, and then we have another set, and so it goes all the time. We have a teacher spending one-third of his time in trying to find out how little the teacher just before him knew, and the pupils are not long in following suit. What is the trouble that our schools are not as good as they should be? Is it the district board? This district board has been "cussed" and discussed, and every Monday in July they turn out and raise $200 to pay the. teacher with and pay the running expenses of the entire district, and so the board is handicapped all the way through.

Let us turn to the superintendent. What kind of a man is he? Has he that invention which is so necessary to a good guide, namely, a back-bone? Has he courage enough, when he goes around and finds that a teacher is a poor one, and that teacher a lady, to stand up and say: "Here, my dear young friend, you can wash dishes a good deal better than you can teach school, and you had better do it?" The superintendent must have moral courage to do his duty by the county that has put him in office. Is the trouble here? Perhaps it is the teacher; perhaps it is the sentiment in the district; but let us see.

We pay a school-teacher from sixteen to twenty-five dollars a month. Does that hold out any inducement to a teacher to go into a proper training school and there fit himself so that when he comes back he may get the munificent sum of sixteen dollars a month? It will not do; we are not holding out the inducement. If you get a good teacher you have to pay money for him. You know very well that if you get a piece of five-dollar cloth, that it is five-dollar cloth, and if you get a twenty-dollar teacher, he is a twenty-dollar teacher, every time. We must pay more money if we are to get good service. We, out in the district, demand too much for sixteen or twenty dollars. We want the teacher to be as wise as Solomon, as patient as Job, and have the executive ability of Grant, all for twenty dollars a month. He must answer every imaginable question, and always stand glass side up for twenty dollars, and the man and the woman in the country, as a rule, who finds the most fault with the teacher because he can't manage twenty or thirty or fifty children is the man or woman who cannot run work well at home.

A Word about Text-Books.—Another thing: If we go into the city we find a text-book here and another one above it and still another above that in a graduated series; but if we go into the county school we find as many text-books of as many colors as that coat we read about. Wisconsin is a wealthy State—a State of wealthy farmers—and many of them have tenants on their farms, and no matter whether they raise a large crop of barley or wheat, they are generally successful in raising a good crop of children. Whenever a tenant changes farms he has to provide text-books for all the way from eleven to eighteen children, and it is quite a burden. We might make a change that would not cost a dollar more than our present system.

The Character of Teachers.—In regard to the character of teachers we employ, if we set our standard a little higher, and raise our wages a little, we might be enabled to get a better line of service. If you hire a man on your farm, about the first questions you ask him are: "Dan, can you stack grain? Do you know how to milk? Can you save hay in the field? Can you break a colt?" You ask him all these questions, and at last you ask him how much he wants a month.

If your boy climbs a tree on Sunday afternoon and falls down and breaks his leg, you will drive twenty miles to Waukesha, or elsewhere, in order to get a doctor who you know is a skilful man at the business; but you will take that boy of yours, whom you love so well, who has a character as tractable as clay, that can be molded in any form, send him away to the school-house and put him into the hands of a teacher who is to mold and build his future; and you never know a thing about where the boy is going, or under what kind of teaching he lives. If you have a blooded colt, you will take him out-of-doors three times a day, exercise and water him, drive him and do all those little things that make a fancy, "toppy" goer; but if you have a boy you will say: "John, take your books and go to school and get back just as soon after four o'clock as you can." And you don't know anything about the school, only what the children say, and that is the most unreliable thing in the world.

We owe our boys and our girls more than this. If you write letters just as deep as the knife can send them into a piece of marble, the hand of time will efface them; but if you place a boy under the hands of an unskilful master, he will grow under those hands, and there is nothing that will show the evils of misdirected effort so quickly as the character of a boy, and there is nothing, on the other hand, that will grow and develop and bear fruit as quickly as a boy's mind under a skilful hand. You owe it to your boy, it is a duty that should be sacred to every heart here, to see that he is properly educated.

The Kind of Teachers to Hire.—What kind of teachers shall we hire? First of all, they shall be men, they shall be women, they shall be living exemplars of what they teach. There was a young lady in our district who came to me a short time ago and said: "What kind of a school do you want taught?" I replied: "I would have that boy of mine taught the little courtesies of life. I would rather have these deeply instilled into his mind than that he should know all the rules of arithmetic and all the lives of the governors of New York." I will tell you how that came out. In about three weeks that boy came home. We sat down to dinner, and I cut off a piece of meat and put it on his plate. He turned and looked at me and said: "Papa, I don't like fat." I said: "Son, if there is anything on your plate you don't like, leave it there and say nothing." His sister sat next to him, and he looked at her, handed her the plate, saying: "Ladies first." That boy learned courtesy with a vengeance.

A School for Every Nationality.—Since we have a common school, let us make it in every sense a common school except in name. It should be a school that shall open its doors to evey nationality. I want my boy to sit by the side of an Irish boy, and I want him to sit by the side of a German boy and a Norwegian boy; I want them to grow up from the same bench together; I want them to understand that we have a government in which there is no platform over men's heads to keep merit down and demerit up; that we are living under a constitution which recognizes merit in its truest sense; that good will rise to the top and that bad will sink to the bottom. Men in this country do not meet you with the question, as they do in England—"who is your grandfather?"—but they look you squarely in the the face and say: "Who are you, and what are you good for?" I would no more wish to have my boy separate himself from the German or the Irish boy than I would that there should be separate seats for the Methodist and the Presbyterian and the Catholic boys; but I would have them all sit upon one common seat, and as they grow up in knowledge and have a judgment of their own, they would recognize that there are good men and true men in every denomination. The worst problem that we have to meet to-day, is the fact that we have sectional feeling all over our broad land and under the same constitution. I would see the boys grow up together, and I would have them develop into good men and good women who will make good citizens, and while they are there together I would have them study that we have a government representing the underlying principles of good citizenship; I would have them learn patriotism in the truest sense of the word; I would have them understand that we are living in a country that is a little better than any other country on God's green earth, and that there floats over us a flag which is the best flag that floats to the wind.

DOMESTIC ECONOMY.

By MRS. J. A. CLARK, Waterloo, Wis.

Fruit for Breakfast.—I will confess that I dread breakfast most of any meal during the day. It is not quite so hard to prepare an appetizing meal for a man who has been up and about for an hour or two doing his chores, and brings his appetite with him when he comes in, but for the brain-workers it is more difficult. For such I would provide, first, fruit of some kind. In melon season, nothing is better than musk-melons. If these are properly started in the hot-bed, the season is a long one, and we can have them each morning for many weeks. In fall, winter or spring, a baked sweet apple with plenty of cream on it is delicious.

Cream—Bacon—Eggs.—Cream, unless our farmer happens to sell his milk to the cheese factory, is one of the things he should be lavish of, and is one of the greatest of edible luxuries. After this, bacon and fried eggs are another of the farmer's specialties. These, with buckwheat cakes and maple syrup, coffee and plenty of cream, make a good farmer's breakfast, and nearly all raised on your own farm.

Maple Syrup.—The only extravagance about this meal is the maple syrup. I was fortunate enough last year to get pure Vermont sugar at ten cents a pound. If you read, as I suppose you all do, the reports of the Experiment Station, you will see that certain of the foods excel in certain elements, and are valuable accordingly, namely, some in albuminoids, others in carbohydrates, protein, etc. You doubtless understand all this, or if you do not, Prof. Henry can easily make it clear to you.

Chemists have demonstrated, that in filling certain of the requirements of the human body, a pound of sugar is equal to three pounds of beef; so you see that sugar is about the cheapest food you can get. Honey, if you have it, makes a good substitute for maple syrup at this meal.

Broil Your Beef-Steak—Beef-steak may be substituted for bacon, only do not fry your beef. There are kind hearted people who will not eat flesh, because the animal has been killed. I do not go as far as that, but when a steer has been killed and his flesh fried in the pan, there has been an additional murder committed, besides the original killing of the beef. I *do* draw the line at that crime. Broil your steak, on a gridiron or wire toaster, over the coals. Cook it rare, serve on a hot platter with salt, pepper and butter on it, and you have your steak as it should be.

Fried Potatoes—Toast—Cheese.—Fried potatoes and nicely browned toast go well with beef-steak, and milk toast, and scrambled eggs are a temptation to a flagging appetite. Dutch or Cottage cheese, eaten with cream, is a favorite dish at our house.

Soups.—In killing a beef you have to take the good and the poor, and in no way can you utilize the poor beef so well as in soups. The French, our greatest cooks, excel in this respect. A recent article in the New York Tribune on this subject closes as follows:

> "It is so good and cheap, it is a part of the daily food of rich and poor. A soup supplies the place of the stimulants, to which too many working men in this country are driven, by food which is so greasy and poorly prepared that it is of little or no food value, and fails to supply the waste of tissues caused by daily work. The good table of a good housewife does more for temperance than a thousand eloquent homilies by a thousand wise men."

Vegetables.—I would recommend the using of a greater variety of vegetables. Try one or two new kinds every year. Not every farmer raises "Brussels' Sprouts," but I think all should. They are a kind of a glorified cabbage, without the objectionable features of that vegetable.

Puddings and Pies—Cake.—Puddings and pies are a good thing to have, especially puddings, and salads are a great addition to any table. Cake is a vanity, and the only kinds called for in a farmer's family are a plain cake with ice-cream, and a wedding cake when the girl gets married.

An Abundance of Good Things.—The ordinary every-day farmer has at his command a continued abundance of good things in the eating line. At our house, just now, we are picking the first fruits of our hot-bed, in the shape of deliciously tender radishes. Next week we will have lettuce, and shortly spinach and beet greens. It is astonishing with what little trouble and expense these things are grown. A half-day's work of our man, at a time when his work is of no account, prepares the hot-bed. The only other expense, except the original charge for sash and box, is the seed and an occasional broken glass.

Ice.—So with our ice. It is the one crop in this country that never fails, and it is harvested when there is nothing else doing. At an annual expense that is not noticeable, it gives us an enjoyment that we otherwise would not have for half a year. I will acknowledge one drawback to these luxuries. Before we had ice, once or twice in the course of the season we would go to the village restaurant and buy a dish of ice-cream. I confess that this, under these circumstances, tasted much more delicious to us than much better ice-cream does now, when taken more commonly at home.

Celery.—In those days, before we had celery all winter long, we used to go to the garden of an old German friend of ours who was so fortunate as to have lettuce fit to eat about the first of June, and none that I ever raised equaled that, flavored as it was, with a six months' abstinence from a fresh vegetable diet. Nature gives its compensation, though I hardly think it pays to go without six months for the sake of acquiring an additional zest to our appetites.

Woman's Special Province.—To provide this food and have the proper arrangement of our domestic affairs is woman's special province. Her education should tend to this. Her business in life is to make some home happy, and to do this, she must have a thorough understanding of the needs and requirements of domestic management.

A Farmer's Wife's Education.—I believe in the higest education for woman. There is no danger of any one knowing too much or being too accomplished, but this higher education, especially for a farmer's wife and daughter, must be built on a solid foundation of *practical every-day household knowledge.* It can detract nothing from the attraction of a farmer's house, if his daughters are good musicians. If they know Latin and Greek, it will do no harm, but rather be a distinction than otherwise in their later days. But, in addition to this, if they are to be farmer's wives, they must know how to take care of a slaughtered hog. They must understand souse, and comprehend cheese, and have a realizing sense of the merits of spare-ribs and pickled pigs' feet, and all the mystery of sausage. In the education of our daughters we make a great mistake if we neglect these things.

Mothers Favor Their Daughters.—There is a tendency on the part of some mothers to favor their daughters at their own expense. They will wash the dishes rather than have these young ladies soil their hands; they will take care of the milk and make the butter while the girls sit in the parlor and practice on the piano. This is a wrong to both of these parties—to the mother, in that she sacrifices herself to one who is under obligation to her, and to the child, because by thus taking her duties from her, you make her selfish, and render the work that must eventually—if she marries and has a family—come doubly hard. How will her children fare without a mother competent to either help or teach them? is the question that should be asked. I do not think there is much of this, but yet every one must have noticed instances.

Conveniences.—Mr. Morrison, when he wrote me in regard to my subject, said: "Even the simple matter of making a delicious cup of coffee is a sealed secret to the great majority of ladies. It seems to me," he says, "that there is about as much stupidity in this direction as can be found in any of the callings of life."

I gather from these remarks of our excellent Superintendent, that in the course of his perigrinations through the State this winter with his institutes, he has put up at the country hotels rather than with the farmers, and I am sure that there he has made a mistake. I can well understand his complaint, if he has tried the hotels; but let me recommend to him another year the hospitality of the farmers. I think he would find that he had improved on his quarters, and that the farmers and farmers' wives would maintain the reputation, that I think they have, of being bountiful and tasteful providers to the best of their ability. I say here, to the best of their ability, and I say it in reference to the farmers' wives. For it is a fact that, in the march of improvement, the great advance in machinery, inventions and in all conveniences, comfort and their means of doing things have *not* advanced as have other kinds of work on the farm. I regret that this is so, for I believe that the *truest* domestic economy consists in furnishing conveniences for the wife and house-keeper, so that she may economize *her own strength.*

Arrangement of the House.—First, the house should be so arranged that she can perform her various duties without too many useless steps. In many houses the cellar is under the "upright," and the kitchen in the farther end of the "L." The well is apt to be on one side of the house, the cistern pump on the other, and the wood-pile far away. Properly, the inside cellar stairs should lead directly from the kitchen—and there should be outside stairs for the carrying in of vegetables in the fall, and for milk in the summer, if the milk is kept at home.

The Sink.—Every farmer's kitchen should be furnished with a sink, into which both hard and soft water should be brought by pumps. It is not always convenient to have the well water thus brought, but there is no reason why the cistern water should not be. This sink should connect with a drain for the carrying away of waste-water. If water must be brought into the house in pails, it surely is too much to ask that it be carried out in the same manner and thrown on the ground to make a spot offensive to sight and smell, and a breeding place for flies. At one end of the sink, a long, broad shelf makes a good place to put dishes as they are wiped, and under this should be drawers for dish-wipers and kitchen aprons, and a cupboard for tea-pot and coffee-pot, tea canister and coffee-mill, and under the sink a place for pots and kettles.

The Wood-Box.—A wood-box built in the partition, between kitchen and wood-shed, opening directly behind the cook stove on the kitchen side, and so arranged that it can be filled from the wood-shed, is a great convenience and saves many steps and much dirt.

The Cooking Room.—A small room on one side of the kitchen to be used as a cooking room is another labor-saver. In this a large flour chest, with partitions, can hold flour, corn meal and rye meal. If of the right height, it makes a good place to rest the molding board upon, while in use. Over it are rows of shelves for spices of all kinds, boxes of raisins and currants, sago and rice and other groceries; near by the sugar bucket, molasses jug, lard jar, baking tins, pie plates—in fact, all and everything that one needs to use in the making of bread, pies and cake, should be in this one room, where it could be reached with scarcely a step.

Cupboard for Dishes.—The cupboard for dishes, built between dining-room and kitchen, with door in either room, will be found a great convenience. Underneath the cupboard, drawers should be placed for storing table-cloths, napkins and extra knives, forks and spoons.

The Sewing Room.—A most desirable room is one which could be used in summer for a sewing room, large enough to contain sewing machine, cutting-table, work-basket, lap-board, a low, easy rocker and an old-fashioned lounge, where the tired mother can take her afternoon nap. If she has such a place, where all her making and mending can be reached at a moment's notice, the time for the nap is much more easily found than it otherwise would be.

Bed-Rooms.—Bed-rooms on the lower floor are a necessity in a house where children are reared. My summer bed-room has an outside door, which I find a convenience and a luxury.

The Living Room.—The room for rest and recreation should be on the south side of the house, into which the sun can shine all through the long winter. It should have a coal stove, or a good wood base burner, and a fire night and day, a little less than eight months of the year. This room should be made as pleasant as one's means will allow. There is no need for costly furniture, but let it be comfortable in every way—light, warm, a place where the children can play on the floor, and the older people rest in easy rocking chairs, with pictures, if you can afford them; books, by all means; playthings for the smaller children, games for the older ones — a room hard to keep in order, perhaps, but one that the children will remember with pleasant recollections all their lives through.

Tack-Puller — Carpet Sweeper.— There are many things for lightening the labor of women, which many of you may have, and others never have heard of. There are no agents to go around and sell them, probably, because their cost is so small that they could not live on the commission they would get. many a woman this coming spring will get down on the floor and pull tacks from the carpet with a screw-driver or a butcher-knife, when there is a little tool made for this purpose, costing twenty-five cents, called "Little Jack, the Giant Tack Puller," which not only pulls the tacks from the floor, but from the carpet. Any small child can use it, and it saves its cost in tacks every two years. A carpet-stretcher, costing seventy-five cents, brings the carpet easily to its place, and saves a great many times its cost in lame arms and aching shoulders, every year. A carpet-sweeper is as much ahead of the ordinary broom, as the ordinary broom is ahead of the hemlock ones I remember seeing one of our neighbors use when I was a child.

The Sewing Machine.—Every one has a sewing machine, but I doubt if any of us ever have our sewing as well done as our mothers had before sewing machines were invented.

The Washing Machine — Ironing. — If any one has a washing machine worth the house room it occupies I wish she would let me know of it. A folding ironing board is very well for children's clothes, skirts, shirts, etc., but I had a little table made, two feet wide, four feet long, set on castors, which is easily moved, and is much better for ironing sheets and long table cloths. The uses to which this little table is put are innumerable, and it is astonishing how much the burdens of life are saved by placing many things on little wheels. Few women are so constituted as to be able to lift much, but their ability to *push* things is something wonderful.

Truck for Moving Stoves.— Speaking of wheels reminds me to say, that with five pieces of 2x4, thirty inches long, and a set of castors costing a dollar, we have a frame upon which we put our coal stove, when not in use, and a woman or child can push it from one end of the house to the wood-shed, and by means of this device the taking down and setting up of the coal stove becomes an easy matter. Most *men can* lift a good deal, but I notice that few of them seem to enjoy carrying around a coal stove.

Cleaning Vegetables.—Every one has an apple parer, and I have tried potato parers but alway return to my little knife. If potatoes are well cleaned with a brush, the paring is an easy matter. The various brushes now made for cleaning vegetables are good things to have, and an ordinary scrub-brush for wood-work does the work much better than can be done with a cloth, and is not nearly as hard on hands and arms.

Folding Dish-Rack.—A folding dish-rack, costing twenty-five cents, is for sale at crockery stores. By using this only half the towels are needed that are required when the dishes are drained in the ordinary manner. A wire dish-cloth for kettles and tins is a necessity in every kitchen.

The Lightning Chopper.—For the making of mince pies, plum, and hasty puddings, and various other things, many people use the ordinary wooden bowl and a chopping knife; but there is a machine called the "Lightning Chopper," which makes play of these otherwise laborious tasks. The knife is carried up and down, in a revolving pail, by means of a crank, and is so easily worked that a small child can use it. It costs about five dollars and is, apparently, indestructible. Mine, after the use of many years, seems as good as new, and has been worth fully the cost of it each year that I have had it. It does not make quite as much noise as a threshing machine, but enough to delight the children, and to let the farmer know, if he is within easy distance, when he may expect something *fine* for dinner. A lemon squeezer and a potato masher are also convenient articles, and cost but little money.

Necessary Tools.—Many things about the house are often destroyed for want of a skilfully-driven nail, or a well-turned screw. It is said that a woman cannot drive a nail, but how can you expect her to if she has only a flat-iron to drive it with? I well remember the first shelf I put up. My tools were a wood-saw, a butcher-knife, and a disabled monkey-wrench. I know more now than I did then, and have a saw, hammer, screw-driver, chisel, two gimlets, a box of screws of all sizes, nails of all lengths, tacks, linen twine, and many other handy and useful things, in a cupboard in my kitchen. I find these a great convenience, as do also the men folks, judging from the number of times they come to the house to ask if they can borrow some of these things, taking care to explain that theirs are laid away under the snow, or in some other equally inaccessible place. They are always careful to return them, and recognize them as belonging entirely to me, and you know it is a comfort to a woman to be absolute owner of something, if it is only a saw or a hammer.

Reserve Supplies.—There are many other branches of domestic economy which I have hardly time to touch upon. The importance of keeping a good supply of reserves, can not be too strongly urged. My mother used to say that sheets and table-cloths should never be worn out, but when about half worn, new ones should be purchased and the old ones laid away for extra occasions. Unexpected and long-continued company often cause us to need large supplies of table linen and, when sickness comes, there can hardly be too much bedding.

Plan Systematically. — Eternal vigilance must be the price of good house-keeping, but eternal drudgery need not be. If we will systematically plan our work; if we will intelligently plan our houses, life will be much easier for many of us. I know many women complain that they cannot rebuild their houses, and cannot procure the conveniences they desire; but I believe that if a woman *knows* what she wants, and will make her husband *know* that *she knows*, in nine cases out of ten she will get it. It is always well to submit to the inevitable with grace and philosophy; but we don't want to get into the habit of accepting as inevitable things which might be changed by a little per sistance on our part.

Too Much Work.—It is said of America, by a recent visitor, that here every one works, and it is also said that work without ceasing is making this country one of the most prosperous, but one of the most unbeautiful countries imaginable. No one here has time to be idle; yet it is only in idleness and leisure that the beautiful can be developed, either in the brain or by the hand. We, the farmers' wives, as a class, are true to our work. We will not only do our duty ourselves but we will bring up our daughters to take our places in the next generation. Nature has done her share in giving us a beautiful State. In no other country does the sun shine on a lovelier landscape. Can we then be blamed if we wish to make our homes beautiful and fit for the situation in which we find them placed? To do this we should have leisure, and if by defects in our domestic arrangements we are compelled to spend the time in *useless* labor which is needed for giving us a higher education and a greater beauty in our surroundings, it is a crime on the part of those whose duty it is to provide for us and for whom we perform our unfailing share.

Buy Your Wife Labor-Savers.—Let the farmer, when he congratulates himself that by his wind-mill he has saved himself the labor of pumping water for his stock; that by his binder, he now does not have to sweat in the harvest field; that by his hay-loader and horse-fork, and mower, and self-dumping rake, he has freed the hay field of its terrors,—let him, I say, when he comtemplates all this labor-saving machinery, use equal energy and wisdom in providing smaller labor-saving implements for his wife, and I will promise, on her part, that she will do her duty, not only in providing for the wants of the house, but also in making a farmer's home what it should be: a place of refreshment, a home where culture and comfort dwell, where elegance and beauty are cultivated, a fit dwelling for that best specimen of humanity, the Wisconsin farmer.

THE FARMER AS A CITIZEN.

By W. D. HOARD, Governor of Wisconsin.

About Calves.—Mr. Thom has spoken about calves. From my earliest infancy down to to-day (I am not paying much attention to calves now) I was brought up along with bovine babies. I have had a deep interest in the little animal called the calf, and, as a consequence, at an early age I made something of a study of the animal. Calves are very much alike, whether they come from one breed or another. As a rule, those who have had experience in dealing with them discover that a thoroughbred calf is the most intelligent. There is a long line of heredity in its behalf but the most provoking thing on this green earth at times is a calf. He will stand and regard you with a look of mild and innocent baby-like wonder, and a stupidity that is unfathomable.

The Deacon and the Calf.—I am reminded of an incident in the history of good old deacon Coolidge, a neighbor of mine in New York, and I tell you this story now for the purpose of explaining somewhat, it may be, certain derelictions or deviations from the strict orthodox pathway that men may be pardoned for indulging in who have the handling of calves. Deacon Coolidge was one of the best men I ever knew, with a heart overflowing with love to his fellow-man, to his Maker, and to all things that his Maker had made. He was a thrifty farmer, and his wife was like him. Aunty Coolidge was one of the best women who ever lived. Sunday morning came. The old man had just hitched up the old mare and started for church, three miles distant. He had driven into the road and turned back to shut the gate, when the old lady said: "Pa, I declare for it, that calf hasn't been fed, and the milk is in the brass kettle on the stove, all warm for him." "Well," the old man replied, "well, well; this is a pretty time to think of feeding the calf, I declare, with my best clothes on. Maria," he said, "what are you thinking of, not to speak of it before?" "Well, pa, you know that we claim to be Christians, and if we should go off to church all day long and leave that poor calf without anything to eat, we couldn't pray enough nor sing enough to make God forgive us for such an act." "Well," said the deacon, "I guess you are right." So he started back, took the brass kettle from the stove, and gathering up his Sunday meeting coat as snugly as possible, he walked along with the milk to the calf, who was impatient and eager and hungry, with expectancy standing right out in his little eyes. The old deacon says: "Bossy, bossy, come along, come up here, come along." And so he inserted his finger, no, two fingers, for he was a shrewd old deacon and knew better than to try to feed that calf with one finger. He led that calf down into the pail, and it began to taste good, and the calf began to get very much engaged in it, and his tail began to show just how he felt. He plunged his nose down below the drinking point, when suddenly (he must have breath) he gave a snort that spurted the milk all over the deacon "I knew it would come to this," he says, "I knew it would come to this, just on account of Maria's forgetfulness. Bossy, bossy, bossy." The calf gave another snort, and the good deacon could stand it no longer, and straddling the calf's neck, he seized both ears and plunging the little fellow's neck in the kettle he said: "If it wa'nt for the love I bear my blessed Lord and Master I would punch your cussed head off."

Well, there are people in this world who would have taken good old Deacon Coolidge in that hour and measured him by one of the seventy articles; but I have an opinion that the Lord had considerable sympathy with Decon Coolidge on that morning.

Calf-Rearing.—One thing I want to say soberly, now, in regard to the rearing of the calf, and that is this: It is said that the women of Holland are the most successful of any people in the world with cattle. Why? Because they come to the contemplation of the needs of these babies from the standpoint of their own motherhood. They understand that this is a *baby* calf. The women of Holland rear the cattle of Holland. I have noticed a great many men in their management of young stock, and have thought thousands of times that if they would delegate it to their wives they would save many very costly mistakes.

Now, one of the points that I would make is this: The calf comes into the world with a baby stomach. No mother attempts to take a puling infant and immediately to pour solids into its little stomach. Nature handles this question from her own standpoint, and if we have an ear attuned to nature and an eye clearly visioned to nature, we can go along, even though we do not read Sanscrit. We can understand the things that belong to us.

This calf is a baby, and for the first four weeks in its history it has what is called a rennet stomach that must take food in the form which nature has designed; it passes then slowly out of the rennet stage into the ruminant stage, when the calf begins first to chew the cud. This varies from four to eight and ten weeks. Now, an observant rearer of calves will easily notice when a calf shows a disposition to commence to chew the cud, and he will never force solids upon the little animal until he shows a disposition of this kind.. We should commence carefully with the calf in this way, and also take another lesson from nature. Nature when left to herself turns the baby calf out with his mother, and he will take his food from ten to twenty times a day. I have studied and watched these little animals many times and noticed how many times they will take their food. If you will follow that law and give the calf his food as often as possible, give it to him in small quantities and give it to him as his mother gives it to him, sweet and warm, you will come as close to nature as you can. Nature don't give a calf sour milk unless it is a Texas cow, and she is ugly enough to give sour milk. I would maintain that practice with the calf till he is six months' old. Feed the calf at least three times a day. Don't let him get so hungry that the stomach is filled with a gnawing gastric juice; then he gorges and bloats himself and brings on dyspepsia. Never allow a calf to occupy wet or damp quarters; that is one of the most important things.

Organized Efforts.—My friends, we have to-day before us, in Wisconsin, a very encouraging state of affairs. You don't know how gratefully comes to me the prospect of seeing the great agricultural thought and intellect of the State awakening in vigorous life to the importance of a stronger and better intellectual condition in behalf of our calling. We are in a most favorable condition; these organized efforts are taking hold of our minds and gradually making them homogeneous. There are, of course, men in the State without thought or idea of the value of rubbing against their neighbors, but the Institute work has come and has come to stay and to tell in every community through which it passes.

Beginning of Institute Work.—The other day, at Lake Mills, at the Institute there, I sketched for a few moments the feeble beginning in Wisconsin of this Institute work. Let me follow it now for a moment. The first beginning of practical Institute work was in the little basement of the church in Lake Mills, in 1870. It was the organization of the Jefferson County Dairymen's Association. From that, meetings were organized and held in a few places in Jefferson County, and one day in 1872, at a meeting in Jefferson, your humble servant was authorized by a vote of that little association to issue a call throughout the State, asking the people who felt an interest in these matters to come together at Watertown and form a State Dairymen's Association. Six gathered there, and they deliberated and established an organization—and then commenced the first practical organized effort under State auspices for the growth of knowledge, and for the improvement and betterment of our ideas and practices.

That association had a very tedious

and hard road to travel for years; but gradually it began to force conviction upon the people. The people began to see that there was a Messiahship in this work; that men had come with ideas to offer to each other, and you remember the meeting of the association a few years ago in this city.

Now, that was the first practical effort, and we have gone on from the organization of the State Dairymen's Association to take a wider and broader understanding of our duty to each other.

The Almoner of Wisconsin.—Some of those duties have been touched upon practically here. We have been engaged in discussing the money-making side of this work, but there is a broader side to the farmer than simply his pocket. He stands to-day not alone a money-maker in Wisconsin, but the almoner of her destiny; he stands as the repository, to a large extent, of the moral and political conscience of this people. To him must be referred, year after year, as a grand juror, the questions that are to effect the well-being of this people, and these meetings are doing more, my friends, to get us to understand and expand the broad relations we bear to each other, than anything that has happened in the course of our lives.

Wisconsin's Population.—We are a peculiar State. We have absorbed into our body politic so vast an amount of foreign material that it is a question whether the process of assimilation shall take place in a harmonious and intelligent manner or not. We have in Wisconsin a population composed of representatives from almost every nation on the globe; our population to-day is 70 per cent. foreign born and their descendants, and we have not thought of this as we ought to have thought. By the census of 1880, there are 40,000 more foreign born voters in Wisconsin than native born, and they are welcome here to our best citizenship. But we need some process that shall take hold of them; that shall make the German feel that he is no longer so much a German as he is an American; that shall make the Englishman feel that he is no longer so much an Englishman as an American; that shall make every man feel that the grandeur of American citizenship stands before him, and that citizenship is the stamp that gives to all character its true value in this country.

The People's College.—Now, to the farmer is delegated to a large extent the growth of this principle, this idea of citizenship. I want to see the farmers of this State take hold of the question of education in a grand and substantial manner. I want them to see to it earnestly that the little district school shall become the people's college as it ought to become; I want the country school-house raised and dignified. We have our colleges and our high schools, and the University, and God speed them all, but the country school, the farmer's school, lies at the root of things, and too often is weak and expressionless. My friends, I want in this Institute work that we shall see the necessity of establishing a ground-work of intelligence. How are we to become intelligent farmers; how are we to carry on our business; how are we to make money; how are we to form ourselves as worthy citizens of a most worthy State unless it be by intelligence?

"By the Sweat of Your Brow".—God says "by the sweat of your brow shall you earn your bread." He did not say by the sweat of your back; he did not say by the sweat of your hands, but he has put that very action and that very place of struggle where it belongs—in the head. Read between the lines and see if he does not mean that if you don't think you shall not have much bread. We need thought and we need encouragement; we need to encourage each other, we need to stand by each other.

Good, Hard Thinking.—The agricultural interest is attacked on all sides, but let me say to you, in all conscience, I believe to-day that the farmer himself in Wisconsin is his own worst foe to his own well being. It is not the monopolists, it is not the politicians, it is not the capitalists, but it is the fact that the farmer himself has not seen the broad gauge to which he should attain for the purpose of emancipating his own business from the thraldom that has encircled it. That thraldom is a lack of good, hard thinking, not hard work.

What Education Does.—Go where you will in Waukesha County, show me the man who is intelligent, the man who reads and studies, the man who follows the lines of thought connected with his pursuit, and that man I will show you almost invariably is the successful man of his class. Now, then, if intelligence is a stepping-stone to success, we need to understand that we must lay broad and deep the foundation of intelligence.

I read a little story when a boy that touched me deeply, concerning John Philpot Curran, the noted Irish barrister. At a banquet to which he was invited by the Prince of Wales, the question went around: "What has education done for you?" Education is not schooling, it is thinking; it is the assimilation of knowledge, not putting on a man a veneer; it is not cramming; it is not polishing a man on the outside, by filling him with digested thought and digested understanding, making him capable of doing something. The question went around the board, and finally it came to Curran, and he rose and said: "Education has done this for me, my lord —It has enabled the son of a poor Irish peasant to sit at the table of his prince." And it is recorded that the Prince of Wales took offense at that statement, and never again was Curran asked into the presence of royalty. More shame be it to royalty!

I am glad that my own country gives me a thousand such examples as this. The poor boy who has struggled with thought, who has struggled with ideas, who has struggled with undertsanding, who has reached up and asked day after day, "Oh, Lord, give unto me understanding," in prayer as honest as ever went out of the human heart—that boy has a right to feel that on him has been stamped the insignia of God's best grace, the hunger and thirst for knowledge. The man in the old story was asked which would he have, wisdom or riches, and he chose wisdom and God gave him both.

The Country School-House.—We need in our relations as farmers, in our neighborhood relations, in our school-district relations, to stand by our little institutions with more loyalty, and that is the reason I made a short plea for the country school-house, standing "like a ragged beggar by the roadside," the desks scarred with the rough touch of the rude jack-knife, the only temple of knowledge that I ever found, and the only temple that ever gave me a start on the road to a better understanding. I see it to-day as it stands upon the rugged hillside in New York; I see the different teachers who came and went to the last day of my school-boy life. I remember one teacher who took hold of my understanding and held my heart, and who, I am sorry to say, found no answer in the thought or conviction of the people of that district. He taught me things; he taught me to understand animals; he taught me to understand the plants by the road-side; he taught me to look out into the arcana of nature, as far as I could go, and said to me: "Remember, my boy, that all these things spread out before you are yours, and given to you for your use." That man started within me a thirst for knowledge that no other man ever did, but it was said of him, by the rude neighborhood, because he took the boys out in the afternoon and let them down into the secrets of nature, took them down into the meadow and showed them the difference in grasses—it was said of him: "He is a consarned fool, and don't half earn his money." Out of that little rude neighborhood there grew a class of boys who will feel to their latest breath the stimulous that man gave them. Now, we ought to make our little country school-house the center of our civilization. We ought to encourage all these things that shall take hold of the boy.

The Boy and the Book.—A poor German boy came into my office about six years ago, with a gentle, kindly face and a mild blue eye, and stepping up bashfully, said: "Is this Mr. Hoard?" The moment I saw him my heart was drawn to him. He drew a long breath, and I could see in the thin clothing on that cold December day the beating of a stout little heart. He was about sixteen years old, and he said: "I came to ask you, sir, if you would lend me a book?" Why, do you know, at that very moment it seemed as if the boy and myself were welded together. Then I remembered in the diary of my grandfather, written on the 10th day of October, 1788, this little entry: "Rose this morning at four o'clock, went into the woods and burned brush; went back to breakfast at six; had mush and milk. Father sent me over to Uncle James' to borrow his almanac to see when the moon changed. Mother said she "*wished I had a book.*" Poor boy, away back there in 1788 laying the foundation of the knowledge of to-day. Out of his ignorance have we reaped grand results; out of the poverty of those men has been builded this nation, and shall we not religiously and conscientiously develop and maintain these institutions and promote knowledge? When the child asks for a book shall we give him a stone?

When the boy stood there I questioned him and asked: "What kind of a book do you want?" and it seemed as if it were the return of my grandfather's request, "I want a book." He said, "I would like a book, I don't care what it is—a book that will teach me something." So I led him to the book case and asked him what he wanted, and what his desire was, and he said that he wanted to know something about cattle. Well, he touched me still closer, you know. I asked him if he couldn't get any books at home and he said no. "Father says that I know enough now, and mother said (oh, I tell you these mothers help the boys out grandly) that she knew you would let me have a book if I came down here, but not to tell father anything about it." Now, the mother reached into the boy's heart; she knew his longing. I gave him the book he wanted and he came back and wanted another and another, and I say to you that that poor German boy will some day be a pride to his mother and to the State of Wisconsin.

The Hope of This Nation. — These things make me glad because they make together for peace; they are encouragements; they help us in our work. We sometimes get discouraged as agriculturists out upon the farm, we think nobody appreciates us and we have a hard life; but remember that out of this great, broad agricultural heart is coming the future of this country; that from it is recruited the statasmen, the managers of the great business enterprises, the blood and the brawn that is the hope of this nation.

Stand by Your Own.—Standing in the Produce Exchange in New York City, a few years ago, I looked over the five hundred men who to-day represent and control the commerce of this nation, and I said to Mr. Armour, one of the Armour Brothers, who was a farmer's boy: "How many of these five hundred men do you think were born on a farm?" I was astonished when he told me that eighty out of every one hundred of these men who were controlling the commerce of the nation were born on the farm.

Then I asked him, "what about their sons?" and he shrugged his shoulders and said: "Degenerate sons of worthy sires. The city is a great mælstrom; it is a great hopper; it grinds up human flesh and blood, but the farmer's boy, of all other boys, is the boy who can stand the grind."

Stand by your own. Stand by your own farm, your little school-house. Stand by everything that belongs to you; magnify your calling; don't belittle it but magnify it, and thus shall the blessing of God follow.

MISCELLANEOUS PAPERS.

ONE WAY TO INCREASE FARM PROFITS.

By PROF. E. S. GOFF, Madison, Wis.

The Plan Suggested.—You will all agree that if there is one thing that the farmer needs to know more than any other at the present time, it is how he may increase the profits from his farm. Prices of produce rule low. Labor and taxes are high. The profits on staple farm products are becoming so small that many farmers are anxiously inquiring how they can support their families and keep out of debt, or still worse, how they can meet the interest on debts already incurred.

If I were to offer a plan with the claim that, by observing it, you could grow wealthy in five or ten years, you might well question the soundness of my views, for fortunes are not often legitimately made in that time. But I have no such plan to offer. I shall, however, suggest a means by which I think it will be possible for some farmers to reduce their cost of living, and at the same time increases the comforts of their homes, and which, if wisely carried out, will, in certain cases, enable the farmer to materially enhance the net income from his farm.

The Cost of Living—On the farm depends largely upon the proportion of the articles consumed that is produced at home. The ordinary farm supplies the family with flour, meat, potatoes, and dairy products. These are the bare necessities of life. If the housekeeper has no other place from which to draw, she will find it very difficult to supply her table with a pleasing variety of wholesome dishes during the whole year. In early summer the salt meat and shriveled potatoes are poor supplyments to the grainary and dairy, and the palate tires of sameness at any season. Either the farmer's living will have to be narrowed down to an unpleasant and unhealthful monotony, or else there will be a great void in the bill of fare, that must be filled from some source. This void may be, and very often is, filled from the grocery. Here the housekeeper may select from a large number of preparations that are convenient to use, and which make very palatable dishes There are oranges, lemons, figs, dates bananas, pineapples, raisins, prunes, dried currants, cocanuts, rice, chocolate, tapiaco, sago, and other products of tropical climates, that modern commerce brings almost to our door. But have you ever stopped to count the cost of the food preparations that we buy at the grocery? Let us take for example raisins and dried currants, produced, we will suppose, in the islands of the Mediterranean, and which have been transported nearly 5,000 miles before reaching our table. The grower of these products has been paid for raising and marketing them—not very well paid, it is true, but perhaps quite as well as is the farmer when he sells corn and potatoes at present prices. The packer has been paid for assorting, packing and labeling them. The steamship and railway companies have been paid for carrying them nearly a quarter of the way around the earth. They have been through the custom house and paid Uncle Sam a tariff. The importer has taken a slice for his profit, and the retail dealer who hands them out to you has had his share, and all of these margins must come out of the consumer. By using these products you are permitting several men and corporations to reap a profit out of your hard labor. Can you afford this? Will you buy all these good things that the family needs? Money is not always plenty, or you do not have time to go to market as often as things are needed for the table. You do not enjoy taking out your purse and emptying out a part of it on the grocer's counter every time you go to town. The result is you are tempted all the time to scrimp, and the housekeeper is compelled to do without much that she would gladly have. We sometimes know better than we practice.

Reduce Your Grocery Bills.—What I am about to say is not new. You have doubtless all heard it before, and some of you have probably already guessed what I am about to urge upon you. There is a way by which you can reduce your grocery bills, and at the same time increase the comforts of your homes, and the wholesomeness of your diet; and this is by providing on the farm a first-class garden. This will furnish you with an agreeable and wholesome variety, for every day in the year. There will be a very small void to fill from the grocery. For instance, as soon as the ground thaws out in the spring, we may have parsnips and salsify from the open ground. These may be followed by fall sown spinach, and this by asparagus and lettuce; these in turn by green peas, and these by string beans, early cabbage and cauliflower; these by sweet-corn and melons, and these by turnips and celery, the latter bridging over winter and lasting until the ground thaws out again in the spring. I have by no means exhausted the list of vegetables, but we will take another example: Strawberries come in about the middle of June. These are followed by raspberries and currants and gooseberries, these in turn by blackberries and the autumn raspberries, the latter lasting until hard frost. Then if the surplus of all these delicious fruit, has been prepared by drying, canning or made into jams or jellies, as the good housekeeper knows how to do, it will furnish an extensive variety of most wholesome and palatable delicacies until June comes around again, and fresh strawberries are once more available. I mentioned only the small fruits I might have added others, but I have chosen these because the small fruit garden may be started very quickly, and the plants with proper protection indure the winter in all parts of Wisconsin.

Buying or Raising. — But perhaps some of you are saying without words: "This all sounds well enough on paper, but we know that we can buy these things cheaper than we can raise them." Are you sure? Have you figured upon it? Let us see. The market gardner's land is worth twice or thrice as much as yours; he pays about twice as much per acre for labor and fertilizers as you do; he sells his products for about half what you have to pay for them at the grocery, and then, as a rule, makes more money on his investment than you do. Otherwise how can he support his family on a few acres, while you require a whole farm to do it? There must be a mistake in your computations. I do not know why the garden should be such a bug-bear to the farmer. As a matter of fact, no one else can have a garden so cheaply. He has the land, the tools and the fertilizers already. All he needs is the will. The old idea that the garden must be cramped up between four short fences, and that all the work in it must be done by hand is a relic of barbarism Next to an energetic man, the horse is the most valuable tool ever put into the garden. With a very few exceptions all garden crops may be cultivated freely with the horse. The garden should be laid out with long rows, and a good broad space be left across each end, to turn the horse on. Arranged in this way, but a few minutes will be required to cultivate it out, and by watching chances, the weeds may be kept down with very little interference with other work.

Profits of the Garden.—I will not here take your time to go into details of culture of the various garden crops. Valuable as the discussion may be, this would form a lecture of itself. As a matter of fact, but little knowledge is required where the will is right. The average garden crop demands no more skill than the average farm crop. Our florist was once asked by a lady: "How do you manage to make your Chrysanthemums blossom so?" "Why, I don't make them blossom," he replied, "the Lord makes them blossom. All I do is to give them a chance." It is just so with the garden. If we but give the things a chance to grow, the kind providence that satisfies all our wants will attend to the rest. I do not wish to say that the garden requires no labor. You and I know better. It does require some labor. So does every crop the farmer grows. But I assert what I can prove, when I say that no half acre on the farm will yield an equal return in dollars and cents and comfort to the one devoted to the garden, provided it is managed in a business-like way. We must, of course, provide for the labor of the garden the same as for the farm. Above all, do not make the mistake, so often made, of feeling that the hired man can never be spared for working in the garden. The boys should be expected to do their share, but should not be compelled to do it all. The boys, and girls too, should be made to feel an interest in the garden, and not to despise it, as they so often do. With this end in view, give them a chance to see something of the bright side of gardening. Buy them seeds of the novelties that are advertised in the catalogues each spring, and let them grow them for themselves. Offer them prizes for the best vegetables, or encourage them to exhibit their products at the fairs. Subscribe for a good horticultural periodical for them, and induce them to grow seedlings and make crosses of their own. Let them dip a little into botany, if they will, and do not cause them to feel that flowers are beneath the dignity of the farmer. And right here let me say that the pursuit of horticulture offers a field for a life work that is worthy the aspirations of the most able and ambitious youth. It has many problems still to be solved that may well engage the highest genius of any age. How may we increase the hardiness of our fruit trees, so that these great Northwestern plains, soon to be the abode of millions of people, shall be able to produce their own fruit? How shall we be able to conquer the host of fungous diseases that menace our orchards and gardens in such increasing numbers? How can we master the swarms of destructive insects that work such havoc with our crops? How may we infuse wild vigor into our improved cultivated varieties? These and other equally important questions cry out for reply, and he who answers one or more of them is no less a benefactor of his race than he who teaches us how to harness steam or electricity.

Special Garden Crops.—In almost every locality there is an opportunity to make some garden crop more profitable than staple farm crops. Either the market demands it or the soil or climate is specially adapted to it. Sometimes this special crop is celery, sometimes it is early potatoes, sometimes it is strawberries, currants, cauliflower, sweet-corn, asparagus or something else. It should be the farmer's effort to discern by careful watching what special crop he can make specially profitable. Here is where the garden may work another great good. Its surplus products will naturally be sold, and a revelation of profits possible from fine early vegetables will thus be made. The real profits of a good garden do not stop at reducing grocery bills or providing home comforts. They often do not stop until they have turned what was a losing into a profitable business, and rolled back the mortgage that was fast enveloping the home.

Don't Neglect the Garden.—Let me urge upon you, my rural friends, no longer to neglect this most important adjunct of the farm. Better, if need be, have fewer bushels of corn and potatoes to sell. You cannot afford to sacrifice any of the comforts or rewards that naturally belong to the farm. Your wife and children need the garden; common sense and good judgment demand it; all sound arguments favor it. The garden was the parent of the farm and can never be divorced from it, without entailing damage, if not positive disaster. Supply your own family first, with all the delicacies that your soil is capable of producing, then take the surplus to market. This is the normal condition of agriculture, and we cannot wisely ignore it or depart from it. Whether business is prosperous or not; whether produce is high or low, the garden continues to grow days and nights and Sundays, manufacturing by its own mysterious processes food for your table out of nature's dead materials. It demands no compensation, but asks only opportunity to confer its benefits upon you. Can you afford to do without it?

WORKING COUNTRY ROADS.

By ROBERT FARGO, Lake Mills, Wis.

Mud and Mire.—In this practical age why do we plod on over worse roads that we had forty years ago? Within two miles of where I stand there are places where the roads at this season are almost impassable from mud and mire, and yet with abundance of gravel almost within a stone's throw. Not a mile from this hall, not long since, the overseer covered a good gravel road with clay from either side, making it, later on, impassable for a load, and the public were forced to take another road into town. He put almost the whole tax into that mud. It was lucky there was no more tax.

How Roads are Worked.—Lake Mills levies about $2,500 annually for road taxes. The town is sub-divided into sixteen or eighteen road districts by drawing arbitrary lines here and there, to suit the whim or caprice of the supervisors or the tax-workers, with marsh and bogs in one district and fairly good roads by nature in another; with perhaps abundance of gravel, and having in each from two to seven miles of highway "*as it happens to come.*" After dinner, town meeting day, with a hoot and a howl, we choose overseers for each of these sub-divisions, not for their special fitness, and for variety we change them annually, so that in ten years we can have 180 overseers. Nice, is it not? This $2,500 is apportioned to each district not according to needed work on the highway, but according to the valuation in each district, so the best lands, and naturally the best roads, get the lions' share of the tax. Why? The tax is worked out by the owner of land on which the tax is levied. Then, instead of making or repairing the roads as we do our other work, when and where it is needed, the overseer calls out the tax-workers all at one time and season, and at a season, too, when every man's time is almost invaluable on his own, farm. In nine cases out of ten the roads are made no better, first for the reason that the overseer does not know the first lessons in road-making, and, second, if he does, he has a shirking, time-serving crowd to handle, whose chief desire is to get the tax out of the way.

Collect the Tax in Money.—Now, what does this $2,500, represent? So much solid cash judiciously laid out in making roads? By no means. It is represented by ruts and mud-holes in the spring, holes, sags and snags in summer and hubs in winter. What would this $2,500 have done if collected in money and laid out as it might have been? It would have macadamized the 45 miles of road in the town *twice*, at a cost of $1,000 per mile, and $10,000 would have been left for repairs, in the last forty years. Get out your pencils and figure what could be done with $2,500! It would employ three double teams and three men at $3,00 per day, and five men at $1.25 per day, for six months (156 days), with no let-up for rainy days, and leave $141 for extras. I venture the assertion that they would accomplish more than has been done in the last ten years.

You Can Stand the Tax.—But you say, "we can't stand the tax?" In this county the taxes have grown from $25,131.64, in 1880, with a population of 30,438 to $93,547.97 in 1888, with a population estimated at 33,000, and you seem to stand that, and don't get any returns, either, except in school moneys. Is your time on the road *pretending to work valueless?* Would not good roads minister to your comfort and improve the value of your lands?

Civilization and Good Roads.—It is said the history of civilization is the history of good roads. Then, measuring ours by the "Appian Way," or the later work of McAdam and Telford, the wheels of civilization have taken a backward motion, and we may soon look for the sun worshippers in high places.

A recent writer on roads and road-making, says: "Roads form a primary element in the advancement of a nation being essential to the development of the material resources of the country." Notwithstanding these axiomatic truths, so terse and vivid, that should appeal to the average farmer for the best methods along this line, we find a hardened indifference that can be explained only on the theory that familiarity breeds contempt. He plods his weary way to the town or railway with his load of produce, thinking by contrast of the "happy land" and "golden streets", when, perchance, a smash-up transforms this saint-like citizen into a low-down "cussing" fellow. He will "cuss" the roads, "cuss" the road-master and "cuss" his luck; but when "those days in June come round to work out the tax," he is the last man there; the first to leave, the biggest shirk; he can tell the best story and cheat himself.

I am here to plead for better methods in road-making. Will some hard-fisted farmer who has lived here for the last forty years tell me how much better the roads are now than then (save the sluices and bridges)? In that time steam and lightning have been chained and taught to do our bidding. We cannot turn in any direction without being confronted with devices to minister to human comfort, except the roads we travel on.

The Only Remedy.—There is only one remedy, and that is to *collect the tax in money*, and have it expended by a commissioner appointed by and under the direction of the town supervisors. Any town that will, can adopt that method by a vote at their annual town meeting. If the people are timid, begin with a one or two mill tax, and when the result is seen there will be no trouble with those who have eyes and nerves. This will be no experiment. It has been in successful operation in some of the New England States for years. The town of Whitewater is a notable example of this method. They had formerly some of the worst roads in the country; they now have the best I know of in the State and it has been done with an annual tax of from two to three mills, about half what most towns pretend to work out. The work is there applied where and when it is most needed, and mud-holes are not allowed to remain from the first of August to the first of June to "get their fill," and there is no nonsense in road-making.

TILE DRAINAGE ON THE FARM.

By C. P. GOODRICH, Fort Atkinson, Wis.

Importance of Drainage.—The subject of drainage is of very great importance to all parts of the State, both as regards the health of the inhabitants and the value of land for agricultural purposes. There is not a county, not a town and very few farms in the State that would not be benefited far more than the cost of the work by a judicious outlay of money in draining low, marshy, malarious and disease-breeding tracts of land, and transforming them from unsightly and repulsive blots on the otherwise fair face of our delightful country to valuable pastures and meadows, and, in many cases, to the most valuable and productive fields to be found for the raising of any kind of grains. The draining of a swamp or marsh in a town benefits every inhabitant of the town by making it a more healthful and desirable place to live in, and in consequence the selling value of every farm in the town is raised even though none of the drained lands are situated upon or even contiguous to it.

Difficulties to be Met.—One great difficulty in the way of drainage has been that it seldom happens that any one man owns all the land that would be directly benefited by, or that lies along the course of, any particular drain, and it would require concert of action and a mutual expenditure of money by those interested to accomplish the work. This concert of action is often very difficult to obtain, owing, in some instances, to the inability of some men to fully realize the importance of the work, and in other cases to the natural selfishness of men who, though they would consent to be benefited, would refuse to bear any portion of the expense, claiming that it would be of no benefit to them. To obviate this difficulty, laws have been passed in this State, whereby town and county boards can lay out and construct such drains, and the cost of construction can be assessed upon the lands directly benefited according to the amount of benefit to each tract.

In some parts of the State considerable attention is being turned, of late years, to this subject of drainage, and much benefit has accrued to the people by the application of this law. Still, I do not think it advisable to resort to the law if amicable arrangements can possibly be secured without resorting to it, for the expense will usually be less if done by private enterprise, and will generally result in better feeling between neighbors. But where it cannot be avoided, men should promptly take advantage of this very just law rather than longer delay work so important.

In my own town several town drains have been constructed with very obvious benefit, and although, in some cases, they were opposed with an energy and determination worthy of a better cause, still, when they were completed, and the improved appearance and productiveness of the land became apparent, all, even those who had been most bitterly opposed to the scheme, were constrained to admit that it was a "good thing."

Tile Draining.—Tile draining has been practiced in Europe many years; but the first done in this country was in the State of New York, in 1835, and the tiles were imported from England. The first manufacturing of tiles in this country was done in 1838, by a Mr. Johnston, of Geneva, N. Y., for underdraining his own land. They were molded by hand over a stick, and he claimed that notwithstanding the great cost it proved profitable. Since then tile machines have been introduced and perfected, so that they are now made very cheaply, and great quantities are used in all the older States where land is valuable, and even in Wisconsin they are rapidly coming into use, and generally with great profit.

Lands Benefited by Tiling.—All heavy clay lands with a retentive subsoil, especially if lying nearly level, must necessarily have the productive soil thin, because it is saturated with water and the roots of plants can not penetrate much below the surface, so that when drouth comes the ground bakes and cracks and the plants look yellow and sickly because they have but a feeble hold on the soil. Such land will be made immensely more productive by under-draining, for that removes the excess of water and makes the soil deeper, more porous and mellow, and better able to withstand either wet or dry weather. It may seem a mystery to you, as it did to me, how water can find its way from a distance of a rod or two underground through such apparently impervious clay to the tiles. I might say, as did the workman who was putting in my first tile drains: "I don't know how, but I *do know* that it does it." And I found that it did do it. It did it much more effectively the second year, and drew the water from a greater distance after the ground had been deeply frozen during the winter, and it did still better the third year. My theory is this: The tiles are and must be laid below the line of frost. When land saturated with water freezes it expands, or, as it is said, "heaves." If it is thawed out with all the water still in it, it soon settles down to its former compact state; but as it thaws in a great measure from below, the water is partially drawn out from below as fast as the ground is thawed, thereby preventing its becoming again so compact, and the water forms small channels whereby it can get to the tiles. Then little channels increase in numbers after each year's frost, till the character of the soil seems completely changed, so that instead of being cold, sodden and water-soaked till late in spring, or after heavy rains, it can be worked with ease as early in spring or as soon after rains as any land.

Another kind of land that can be greatly benefited by tiling are our lowlands, some of which have inclination enough for surface drainage, but are kept cold and wet by water rising from below.

The greater part of the rain which falls on the uplands where there is a porous subsoil sinks down into the earth, and this water must find its way out somewhere. Much of these lowlands of which we are speaking is underlaid with a thin stratum of clay, through and below which are streaks of sand and gravel. Now, if the water line through the porous earth under the uplands is higher than the surface of the lowlands, the pressure of the water on the higher level will tend to force the water under the lowlands up through this thin stratum of clay. This it does, sometimes in the form of springs, but more commonly all over the surface, or, it might be said, in an infinite number of very small springs. Some lands that seem quite solid and dry and were never suspected of being springy, but for some unaccountable reason are cold and unproductive will, by close examination, be found to be of this class. Now, if a sufficiently deep outlet can be secured and such land tiled, say four feet deep, or deeper if you can—the deeper the better—with lines from three to four rods apart, it will intercept this cold water and carry it away before it rises high enough to injure vegetation, and transform land which will produce nothing but the poorest kind of marsh grass, into the most productive land in the country, which will bear large crops of any kind of grain or grass in any season, whether wet or dry.

I have tiled some such land as this. It is the first land I can plow in the spring and the first I can cultivate after a rain, and produces larger crops, no matter whether the season is wet or dry. Water has constantly discharged from the tiles for four years, not ceasing in the severe drouth of last fall. Frequently water oozes out of the ground at the base of a hill by the edge of the lowland and soaks out upon it, keeping it wet for a long distance. In such cases a line of tile run along the base of the hill at a good depth will cut off this supply of water and dry the land for a long distance. I have one such place as this where the land has become solid and dry ten rods below the tile where formerly it was frequently too soft for horses to go on.

One kind of wet land it will not, in my opinion, ever pay to tile—that is where it is composed of nothing but peat to the depth of three or four feet. It can be dried out, but then it will be so light that it will produce nothing. The best that can be done with such land is to drain off the surface water and then pasture it or mow what little poor grass may grow on it.

Manner of Doing the Work.—First, a good outlet into an open ditch or brook must be secured, at least 4 feet deep; then lay out the lines for the tiles where, in your judgment, they will do the most good; but they must have a little fall through the whole length of each line. It might be convenient to have an engineer do this, but the owner of the land, if he has good judgment, and has observed the flow of water over the surface in times of heavy rains, can do it without the help of an engineer. One inch fall in 100 feet will do if no more can be had. The distance apart of the lines necessary depends on the kind of land. If very retentive clay, they should not be more than two rods; in some other lands four rods will do as well. The ditch should be made as narrow as possible, and give room to work in, say 18 to 20 inches wide at the top and 6 inches at the bottom. The bottom of the ditch can be smoothed and fitted for the tiles with a true, even grade, with a scoop made for the purpose. If there is a little water running in the ditch no trouble will be had in getting the grade correct. If there is no water some kind of a level will have to be used. Lay the tiles in so they will fit as closely at the joints as possible. If there is water running in the ditch you have to begin at the upper end to lay them, otherwise the running water will carry mud and sand into the tiles. If there is no water you can begin at either end. Cover the tiles with a little marsh hay or straw or something of the kind, and then put on a little earth (clay is preferable) and pack it down well. The rest of the filling can be done quickly with a team and scraper or plow. Three-inch tiles are large enough for short lines, but if they are more than 60 yards long, or are in places where considerable water is likely to run, then larger ones should be used

The Cost of Tiling.—It has cost me 25 cents a rod to get tiles put in 3½ or 4 feet deep. Last summer I paid 30 cents for some but a part was through a cut 5 feet deep. Tiles cost at the factories in the southern part of the State $10 per 1,000 feet of 3 inch and $15 for 4 inch. At this rate it would cost to tile an acre with 3 inch tile, 4 rods apart, $16.60; 3 rods apart, $24.90 and 2 rods apart, $33.20.

Now, the question for each one to ask himself is: "Have I any land that it will be profitable to tile drain?" The correct answer will depend on circumstances—the value of good land and the cost of labor and material in your locality, as well as the kind of land you have. If the cost will equal or exceed the value of good land, then the decision would doubtless be against doing the work except in special cases, such as where there is a wet place in the middle of an otherwise good field of plowland; or where there is a narrow strip of wet land running through and dividing a field in such a manner as to make it very inconvenient to work; then it may well pay the cost even though the value of an acre is no more than the expense of tile draining it.

GRAPE GROWING AS A PROFESSION.

By WM. FOX, Baraboo, Wis.

Not Acquired in a Day.—Successful grape growing is not acquired in a day, a month, or a year. It has to be learned gradually, and by patient observation and practical experience, line upon line, precept upon precept, here a little, there a little, year after year. This makes the grape culturist proficent in his vocation, and then he can continue to learn something new and important in regard to it during the whole of his life-time.

In the last ten years it has been demonstrated that we can raise grapes as well as any other Northern State.

Location.—The location of the vineyard should be on a hillside sloping preferably to the south, although the earlier varieties succeed well on a northern slope.

Soil.—It used to be said that grapes would grow on the poorest soil, but in my experience it takes the very best, which also needs to be fed liberally from year to year. All soils are not good for all kinds of grapes. Delaware, Brighton and Lindley, when once thoroughly established, do their best on clay soil; they also do well on heavy clay loam. Concord and its seedlings do very well on most soil but best on clay loam; Catawba, Diana and Roger's Hybrids, sandy loam, or dry and porous soil, with a good, healthy exposure to plenty of fresh air and sun; Iona and Cumberland, on black muck soil. I speak of these points from my own experience. All our grapes do best on land well cultivated and properly drained. Grapes should not have wet feet, nor will they do well with them, for with the ground wet it is cold and unhealthy which causes the vine to decay, and they soon die from premature old age. This will not be the case on land that is well drained so that heat and air can penetrate to the roots. If land is wet I would advise tile laying.

Preparation of Soil.—The next important step is preparation of the soil, which it is to be presumed is drained. Deep plowing is best, following in the same furrow with a good sub-soil plow, breaking the ground as deep as you can. The object is to loosen, so that the fine, tender roots can penetrate it and make a healthy growth in the first year, which they will not do if this plan is not followed.

The old way of plowing shallow leaves the sub-soil hard, and then, too, the hole is often hardly large enough to admit plant and roots. The young roots cannot penetrate the hard walls of their cell; consequently they will seek the softest and most accessible spot, and climb on top of the soil unless, perchance, there is a crevice near-by, into which they will dive down and seek what they must have to live and thrive on, namely, moisture, and they will go down until they find it. All these means, of course, apply to land of heavy clay sub-soil and to light loose soil.

Selection of Varieties.—Next comes selection of varieties, which the vineyardist must determine for himself by carefully noticing how early frost comes, and what variety will mature in an average year. I find, with me, that Moore's Early, Early Victor, Worden, Concord, Red Brighton and Delaware, for summer, very seldom fail to mature; for winter keeping, Vergennes, Roger's No. 3, 9, 15, 53.

Planting and Rearing.–The next highly important step to be taken is the selection of roots. I would have a first class yearling root in preference to any other. I cut the tops to buds, and have them ready to set. The hole should be dug as deep as cutting is, so that the crown of cutting will come a trifle below the surface when the ground is leveled. I would then set perpendicular, laying in the roots carefully and straight. Any carelessness will not make a good, healthy vine. Cover the roots with loose, fresh surface soil. Well rotted manure or fertilizer will be beneficial.

Cultivation.—Cultivate and hoe during summer, and cut back to buds. Cover the vine in winter, and do it well. The second year keep them growing. Cultivate and hoe. Do not let them get stinted. Break away all but two canes; let them grow, and tie them up. Take care that you get ripe wood in the fall. I cut back to two buds and cover again as the year before. In three years the roots will be strong, and you can leave more canes. Be careful and cut away all unripe wood; also take care to not let your vines over-bear. When they do cut them off. I do not believe in extreme checking. Check only for the benefit of vine and fruit. I also cannot see any benefit in breaking off leaves. I find more a lack of leaves than too many. I begin to prune in October, and lay down in November from four to twelve, according to weather.

BUTTER-MAKING ON THE FARM.

By MRS. A. H. DARROW, Brandon, Wis.

Beginning the Work.—When dairying first went into effect on our farm, it was from necessity as well as choice. My husband had raised wheat so long, and was growing poorer each year (and the land no richer), that it became evident a change must be made. The milk was taken to the cheese factory for a number of years with quite satisfactory results at first, but the receipts grew less each year, which was not, of course, very satisfactory. Having become somewhat enlightened, it was decided to procure a creamer. A well of good water close by the house, and a wind-mill to do the pumping, made it quite convenient. The creamer and pump were inclosed in a small building, and we proceeded to the business of manufacturing butter.

The Right Kind of Cows.—The right kind of cows is one of the essentials to success—those that will manufacture the food they consume into milk of a butter producing quality. The feed given should be the very best the farm can produce. The care of these cows is of great importance. This includes warm stabling in cold weather, warm water to drink, dry shelter at all seasons of the year, and regularity of feeding and milking. Too much stress cannot be placed on the latter point, also on the cleanliness practiced in caring for the stables and all utensils used in caring for milk and butter.

Care of Milk and Cream.—Milk should be taken from the stable as quickly as possible after being drawn from the cows, for the double reason of getting it away from the odors of the stable, and that it may be strained before having a chance to cool. In spite of these efforts, in winter, the temperature will fall to about 90 degrees. We add warm water (not scalding) to raise the temperature to 100 degrees. Prof. Robertson gives as a reason for so doing: "It washes off the fibrine, caseine and albumen which accumulate on the fat globules and permits them to rise more rapidly through the milk. Cream from milk thus treated will also churn more rapidly than cream in which these other substances remain." Our reason for adding the water was to procure all the cream. The cans are then submerged in ice-water. The greater the number of degrees through which milk falls while cream is rising, the more perfectly does it rise. Wishing to ascertain if we were getting all the cream, we took, some of the skimmed milk, after having been treated in this way, and warmed it again to 102° and re-set it, to obtain the rest of the cream if any should remain in the milk; but not a particle was to be seen.

Ripening the Cream.—The cream is kept at a low temperature until enough is obtained for a churning, then all ripened together. This is done by warming to 60° in the morning and letting it remain at a temperature of about 70° through the day, and the following morning it is ready to churn. The degree of ripeness is indicated by moderate sourness. To mix sweet cream with sour before churning is a mistake, for the sweet cream will not churn in the same length of time as the sour, and what butter the sweet cream contains will be left in the buttermilk.

Warming the cream as mentioned is a sufficient "starter," and the cheapest to be obtained.

"New Fangled" Articles.—I believe we are through investing in new fangled articles until knowing something of their good qualities through some one who has sufficiently tested them besides the inventor, and I know of no better place for these experiments to be tried than at the Experiment Station, where those in charge are paid for services and are unprejudiced in decisions. We have had some experience in this line, hence the advice. Being desirous to learn just the good or poor qualities of our cows, we invested in aparatus. Not being successful at first, I wrote to the parties of whom it had been purchased, received more minute directions and tried again. Everything worked well, and, according to the test, it required 200 lbs. of milk to make 5½ lbs. of butter; or 36 4-11 lbs. for 1 pound of butter. We were sure this could not be correct. We then set the milk of the two cows we had been trying to test, to ascertain how much it really did require, and it took 25 lbs. of milk for a pound of butter.

Churning the Cream.—The cream is churned at a temperature of 66° in winter and 62° in summer. The use of a thermometer is all important, that we may be accurate in the temperature. Perhaps some will inquire: "Why be so minute in the small particulars?" Well, it is usually the case that the smallest things are those that perplex us most. Your butter might have brought the highest price had it all been colored alike, but as the tryer is withdrawn it displays yellow, yellower, yellowest, and on that account you lost from 5 to 10 cents per pound. Now, had the same amount been churned each time, and the color dropped instead of being measured in a spoon, the "gilt" would all have been the same shade. So the rule proves itself that it pays to look well after small things. When color is used, it should be added when the cream is ready to churn. When the cream has been churned until the butter begins to separate, which is readily detected by the welcome sound, reduce the temperature to 60 degrees by adding cold water, which will also serve to thin the buttermilk. Then churn a little more until the buttermilk will run off free from butter and still leave the butter in small granules. Next wash in weak brine, then in clear water until the buttermilk is washed out.

Salting the Butter.—Now leave to drain a few minutes and weigh salt, allowing 1½ oz. to the pound, more or less, as those wish for whom it is made; 1¾ oz. is as we salt ours, for that is as our customers wish it. After the butter has drained, we salt it in the churn, revolving it a few times, then let it remain draining for about an hour, when the salt will be dissolved; then take it to the butter-worker and press out the brine by the use of the lever. We have tried the plan of discarding the worker, and at times it worked well, and at others left too much brine in the butter, while if placed upon the worker one can see just the condition it is in. We have no desire to sell our customers brine, as they can make it cheaper if they wish it, and we have the consciousness of selling the genuine article.

Packing — Marketing.— After this process, we pack in tubs which have been soaked first in scalding brine then in clear water and afterward rubbed with salt, and the "gilt-edged" butter is ready for market. This method of making butter has given perfect satisfaction to our customers whom we have supplied a number of years; have lost but two, and this was on account of price;

they wanted cheaper butter. After considerable experience with commission houses, we have concluded the less we have to do with them the better, and find it much more gratifying to send directly to "gilt-edged" people who know and appreciate a good article when they get it.

HOW TO MAKE AN INCUBATOR.

By F. E. PARSONS, Lake Mills, Wis.

Artificial Incubation.— Although the hatching of eggs by artificial means has been proved a success by many people, there are still incredulous ones who fear the undertaking, chiefly because some one with whom they are acquainted has made the attempt and failed. It is generally admitted that if artificial incubation can be made successful it will be a source of profit to the poultry raiser, and as this question has long since been settled by successful poulterers we need spend no time in discussing the feasibility of the process, but devote it to the more profitable task of explaining the process, and in setting forth briefly the manner of its application. All that is needed to hatch eggs in the number of days allotted to the process by nature is to give them the correct number of degrees of heat, with proper airing for that number of days.

Mode of Construction.—Failing to reach success by the use of a highly recommended *incubator*, I took upon myself the task of inventing one, so that, if possible, I might prove the feasibility of the process. For the purpose of this, I secured a sound dry-goods box, with matched joints, three feet long, thirty inches deep, and thirty inches wide. I removed the cover, stood the box on end, with open side to the front. I then passed through it, from side to side, four half-inch iron rods, equal distance from each other, as a resting place for a sheet-iron floor. These rods were eighteen inches from the bottom of the box, which, for safety, was lined with tin up to about two inches above the rods. The sheet-iron floor was cut to exactly fill the box, thus dividing it into an upper and lower room. One-fourth of an inch from the edge of this floor I punched half-inch holes, four on each side, and in the middle I cut a six-inch round hole. The lower room was intended for the heating lamp, and the upper one for the nest. I made the nest box two inches smaller than the inside measurement of the large box, and high enough to reach from the floor to within one inch of the top of the main box. The top of the nest was covered with a wooden top large enough to touch the main box on all sides, thus projecting over the nest one inch all around. To this nest I put no bottom floor, and left the front open except four inches at the bottom. I then procured at the tinner's a galvanized-iron tank four inches deep, just large enough to fill the inside measurement of the nest, so that when the nest was placed over it, both could be set upon the sheet-iron floor of the main box, and the tank be exposed to the heat from the lamp below. To close the open part of the nest in front, I hung a door to the four inch piece in front of the tank, with a spring bolt to hold it at the top when closed. In this door I placed a window 6X3 inches, back of which was a thermometer, inside the nest, by which I could tell the degrees of heat at any time without opening the nest. Inside the nest, on the right and left were cleats, five inches apart, on which the egg-rack rested. In the top of the tank there were eight quarter-inch holes for the escape of vapor upward among the eggs, and one at the front top, ¾ of an inch in size, for the purpose of filling the tank. I closed the front of the outer box with two doors; one hung at the side for the bottom room and one hung at its bottom edge, on a level with the top of the tank, held in place when closed by a spring bolt. In the cover of the nest-box there were half-inch holes, corresponding with those in the sheet-iron floor below, and also a few quarter-inch holes over the eggs for the escape of heat and draft. In the top of the main box I cut a four-inch hole to act as a chimney, and in the bottom a few auger holes to secure a free circulation of air.

Results.—With this incubator I received a better return in healthy chicks than I received from the hens which were incubating at the same time. By repeated tests I found that 95 to 100 degrees of heat is best for success, and that twenty minutes airing and a complete turning of the eggs every day is absolutely necessary. I found that removing the eggs from the nest, and keeping the incubator closed during the airing of the eggs, is the best method, and that by having an extra egg-rack to lay over the filled racks, an entire rack of eggs could be turned at once by holding them tightly and turning them over with the hands.

The Brooder.—When the chicks are hatched they should be removed to the brooder when dry and strong, and fed a little yelk of hard boiled egg mixed with bread soaked in milk and squeezed as dry as possible; a very little food at once, but given often, is the way to feed them. A good brooder should be high enough from the floor or ground to admit a lamp underneath and a free circulation of cool air under its floor, as chicks must have their backs kept warm, and their home must be always dry. A brooder is a box long enough to contain a tank for water, the bottom of which should project below so as to come in contact with the heat of a lamp, and the top should be tightly covered so that the heated tank will keep it warm and dry; a part of the top should be glass. At four days old chicks should go out into a pen where they can scratch in fresh earth. The lamps can be small both in the incubator and brooder, and the food after three or four days can be bread, boiled potatoes, corn bread, dutch cheese, etc., with clean, fresh water always within reach for drink. Never let the chicks get wet or cold.

The Egg-Racks and Tank.—The egg-racks are frames one inch deep, with cross strips about an inch and a half apart beveled on both sides at top and level with the frame at bottom, covered below with wire screening nailed fast to both frame and cross strips. In the gutters between the strips the eggs are placed, and will remain firm in place when another frame or rack is placed upon it bottom upward for the purpose of turning the eggs. The tank described will heat about a pail of water which will last for months. The water should be put in hot (to save time), and kept hot with the lamp, so that in the nest 97 or 98 degrees of heat will be found steadily. Too much heat is death, but 103 degrees is safe. Too much cold is also death, but occasionally at 90° will do no harm for a few moments.

Poultry for Profit.—To raise poultry for profit the incubator is a great helper, for it saves the time of the hens, enabling them to return more eggs, and the brooder properly made and managed is much better than the mother hen. With the same number of hens to furnish eggs, it is safe to say that twice the number of chicks can be raised by artificial incubation and brooding, than can be raised by using hens from among the layers as incubators and brooders. There are a large number of people in the United States making fortunes raising poultry for market, and the most prosperous ones have discarded hens as incubators and brooders, and resorted to the artificial process which enables them to enlarge their buisness almost without limit. Breeders of fancy fowls, who charge fancy prices for their stock and two or three dollars for a dozen of eggs, quite generally disapprove of the artificial methods, but those who make it a business to raise poultry for food think highly of the new method.

LOOK AFTER THE BOY.

By MRS. CARRIE S. HOBART, Jackson County, Wis.

Entitled to More Attention.—The boy on the farm is entitled to more attention and consideration than he usually receives. It is a common thing to find, not only among farmers but among others, people laboring under the erroneous impression that a boy who is likely to remain on the farm needs very little education in preparation for his vocation, and that a very limited amount of brain is absolutely necessary.

It frequently happens, as Senator Howe once said, that the smartest of a family is sent to college to become a lawyer or physician, and the dullard is thought to be fit only for a farmer, when, if this order of procedure were only reversed, better results might be attained.

Too many boys, owing to a disinclination for school, are allowed to remain away, or obliged to do so that their time may be given to the farm; and this just at an age when they are most capable of applying themselves to study. They ought to be *obliged* to remain till our schools can at least have an opportunity to teach them the value of an education, and so interest them in it that they will never be content with the little knowledge acquired there.

Have Good Schools.—Look to it, then, that your schools are what they should be. If they are not, investigate the matter with a view to finding out whether the teacher deserves all the blame, or if, perchance, some of it does not rest upon the shoulders of each individual of the district. Are you sure the teacher receives from you the sympathy and support necessary to make her efforts effective? Keep this thought with you—all the responsibility of the education of my children does not lie with the teacher. Never take your boy from school because he knows as much as his teacher; just get one who knows a little more.

Qualifications.— Can a farmer know too much? Perhaps of some things; but he can not know too much concerning his own business. Does that signify much or little? I would not discourage a small boy thinking to become a tiller of the soil, by reading him a list, at the outset, of the requirements necessary to properly qualify him for the business. What are a few of them? A knowledge of chemistry, something of feeding, drainage and breeding; some knowledge of the structure of domestic animals, how to prevent and cure diseases common to them; political economy, an idea of mechanics. Even if he be a specialist, there are many things he ought to know aside from his line of work, in order to add to his comfort. In addition to all these, he must be careful, painstaking, methodical and practical. What do you think of the length of the list?

Now, the father ought to see that the boy acquires a knowledge of these subjects. What advantages does he give him for such acquirement? Usually the benefit of his own experience. Well and good, if the father is a successful farmer and takes pains to train the boy; but how many, on this basis, feel competent to train him?

Actual Experience.— Some farmers who might do much for their sons, are too content to let the boy profit by his example in so far as he may by merely assisting with the work. Too few there are who give them *actual experience.*

Even at the risk of small pecuniary loss, let the boy have either stock or land and be made to feel the loss or gain derived from the use of his capital. Don't give him a pig, sell it, pay him back with another pig, sell it, and so on, for this I know to be most tantalizing treatment, and not at all calculated to inspire him with very great solicitude for the welfare of the third or fourth pig, at the least.

Means of Information.—If you are not as successful as you ought to be (I will not say as you want to be) where then will your boy turn for aid? To your neighbors? No, that won't do, for I take for granted you have yourself profited by their experience as much as possible.

Farm journals come next. Do you take one? If you do, are you in the habit of reading and discussing it with your boy? If you have found it a little hard to interest him in your journal, have you tried having it or another sent to his address? It is wonderful what a difference that will make sometimes. Try it; it is a cheap experiment.

Suppose you don't possess the paper and your excuse is, "can't afford it." Did you ever try going halves or quarters with a neighbor, to secure the necessary; or are you one of those we hear of occasionally, who "don't believe in book learning, 'taint practical?" If you are, play Yankee and "figger" out why it is that the lawyer, doctor, teacher and men of *every* profession, except your own, need journals devoted to their work, to enable them to keep abreast of the times.

Take for granted that you have these helps, but are not quite successful yet. Are there any other means of acquiring information? Can it be possible there is a farmer in Wisconsin who does not know of the Farmers' Institutes? Possibly, for it was not a great while ago that I heard a teacher, who had for years taught in the country schools of Jackson County, say she had been in several homes where there was not a paper of any description.

Do you know any who stay away from these institutes, through indifference—for instance farmers who think these institute conductors are *rich*, *big* farmers and that their experience can therefore be of no use to them? Has this class been here and tested the practicability or impracticability of the information given? I hope they will, at least, give these rich gentlemen credit for not being monopolists. Think of it—rich farmers who don't want to monopolize the knowledge for acquiring wealth! It is a wonder the country does not turn out from mere curiosity to see this rich anti-monepoly band.

Can there be any farmers here who are so interested in the work of the institutes that they leave "bub" at home both days to do the chores? Can it be the boy is deprived of the privilege of hearing these new ways for himself? And think what the youth misses by not being able to tell his friends about what "I saw and heard at the institute." If possible, bring him both days—at least let him come once.

Is this institute the last resort for information? No, thanks to our wide-awake university regents, we have the twelve weeks agricultural course at our State University. Every farmer ought to know what are the advantages of this course, the expense of taking it and, if possible, avail himself of the benefits it may afford. Then, there is the long course in agriculture that the State University offers. Look this up with a view of sending the boy there another year.

Wisconsin's Advantages.—The superior advantages offered by Wisconsin to her farmers are apprecated abroad. The London Live Stock Journal of England, commenting on our agricultural system, among other things, says: "Neither bad seasons, depression of trade nor a faulty fiscal system can possibly keep down a people so intelligent as the inhabitants of Wisconsin prove themselves to be." We find Canada taking great interest in our methods, and sister States marveling at and inquiring for reasons of the success of our institutes. Gov. Hoard says that last winter he received over one hundred and fifty letters, from Eastern gentlemen, all of this tenor: "What is the price of land in Wisconsin? We read much about your institute work. We think it must be a *grand State* to send a boy to occupy a farm, where men can amass information like that for the good of the farmer." When these advantages are duly appreciated by a majority of our farmers, then will be the dawning of a brighter day for the Wisconsin boy, and *not* till then—for it is not to be expected that fathers will be likely to give their sons advantages which they, themselves, do not recognize the value of.

The Boy's Pleasures.—As to the boy's pleasures: Provide him with interesting games, but don't think your duty ends there—take part in them. If he likes fishing—and what boy does not—fix up and go an an excursion for a day or two with him. You will enjoy it yourself.

Try to so manage affairs that either in your company or alone he can visit places of interest in his county or State. Get up a load and go to town when there is an exceptionally good lecture or entertainment to be enjoyed. Let him have plenty of company. In fact, devise every means you can to make him feel that all the good times to be had in the world are not prohibited the farmer.

Good Literature.—Too much attention can not be given the matter of supplying him with good literature. Let him *own* good books and papers. With much of standard literature to be purchased for from 10 cents to $1.00 a volume, there can be no excuse for any one being without plenty of good healthful reading matter. Of all things don't have in your homes a newspaper of the Police Gazette style, such as many of our dailies have grown to be.

Public Matters.— Never let the boy hear you say there is no use of a farmer giving public matters any attention; but endeavor to impress upon his mind the obligations imposed upon him by citizenship and the desirability of his doing it honor. If you feel called upon to tell him of the poisonous political atmosphere, at the same time emphasize the fact that it will never be purer if good men hold themselves aloof from politics.

Worthy of Respect. — The boy should be made to see that farmers are as worthy of respect as men of any other vocation, and if he has ambition in other lines than farming he stands about as good a chance of succeeding as though he were of the city. Let him know Socrates was a farmer, and author of an immortal philosophy; that Burns could compose a poem while plowing; and in familiarizing him with the lives of Washington and Jefferson, do not forget they were farmers. Lastly, do not let your boys have occasion to describe their life with you as a Yankee once vividly described his. Said he:

"Father used to say, when I lived on the farm along with him: 'Sam,' says he, 'I vow I wish there was jist four hundred days in the year, for it's a plaguy sight too short for me. I can find as much work as all hands on us can do for three hundred and sixty-five days, and jist thirty-five days more if we had 'em. We hain't got a minit to spare; you must shell the corn and winner the grain at night, clean all up slick, or I guess we'll fall astarn, as sure as the Lord made Moses.' If he didn't keep us all at it, a drivin' away full chisel, the whole blessed time, it's a pity. There was no 'blowin' time' there, you may depend. We plowed all the fall for dear life; in winter we threshed, made and mended tools, went to market and mill, and got out our firewood and rails. As soon as frost was gone, came sowin' and plantin', weedin' and hoein'; then harvest and spreadin' compost; then gatherin' manure, fencin' and ditchin'; and then turn tu and fall plowin' ag'in. It all went round like a wheel without stoppin', and so fast, I guess you couldn't see the spokes, just one long everlastin' stroke from July to etarnity, without time to look back on the tracks."

SHALL I BUILD A SILO?

By L. H. ADAMS, Wisconsin Experiment Station, Madison, Wis.

The Silo a Success in Wisconsin. —Shall I build a silo? is a constantly recurring question, and one that every year's experience, with drouth and early frost, is intensifying and bringing out in greater numbers.

The system of preserving feed by means of the silo has been in practical operation in Wisconsin nearly ten years, and is, therefore, reaching an age which should enable it to speak for itself. Nearly every farming community in the southern part of the State now has a silo in or near it, which makes it possible for those who are considering the question of building, to study and familiarize themselves with the entire process, from that of filling to feeding out, before undertaking the work, and they are, therefore, not called upon to exercise that degree of faith in the new departure that was required of the pioneers, who could do nothing but follow directions blindly.

Some Causes of Failure.—It is a significant fact that the men who have had the most experience in the construction and filling of silos speak favorably of them, while the objections come mainly from the persons who have never had anything to do with them. It is true that a great many made partial failure the first time they filled their silos, but in nearly every case it would be admitted that the difficulty was owing to faulty construction, or improper methods of harvesting and filling, and could be easily remedied the next time the silo was filled.

Experience has taught us how to improve the quality of our ensilage, by taking the corn at the proper stage of maturity, as well as the best manner of feeding, so that the objections urged against it in its early history—first, that it caused the animal fed upon it to scour, and, second, that it gave the milk from cows kept on ensilage a bad flavor—have been nearly, if not quite, overcome. It should be remembered that there is no single food that would give entire satisfaction if fed exclusively, and, therefore, the silo should not be held to account for our own ignorance of the proper use to make of it in order to obtain the best results.

Value of Succulent Food.—It is conceded by all intelligent and acknowledged authorities on cattle feeding, that one feed a day through the long winter months of some succulent food of the nature of roots is very desirable, if not absolutely necessary, to the proper assimilation of the mass of roughage and concentrated grain feed that is to be converted into beef and dairy products, and to maintain the health and spirits of the animal. For this purpose there is nothing that will compare with the silo for practicability or economy. This point of excellence is conceded to ensilage by writers who oppose the general adoption of the silo system on the ground of excessive cost; but the cost of this system of preserving feed is not excessive when all the advantages made possible by the silo are compared with the wasteful and unsatisfactory manner in which we are obliged, by force of circumstances, to handle air-dried fodder that has been put up in stacks, or, more likely, left shocked in the field. Some one may ask: "Why leave the shocks in the field; why not stack the fodder, or, better still, mow it away in the barn?" To which I answer that the latest and most comprehensive views taken of our greatest forage crop, and chief dependence—corn—will not allow of its being grown in the same manner, or harvested at the advanced stage of maturity, that is necessary to its successful preservation in large masses, either in stack or barn. Instead of growing a crop of corn at the same outlay of labor, for the ear alone, as formerly, we are coming to prize the stalk equally with the ear, and steadily acquiring better knowledge of the proper time to harvest, in order to combine the maximum nutriment in the ear and stalk.

An Important Factor.—There is another economical factor of great importance that is seldom credited to the silo where it properly belongs, and should always be considered in connection with the cost of filling the silo, and that is the reduced labor necessary to take care of a herd of cattle throughout the winter where the feeding is done from a silo that is conveniently located in or very near the stock barn. One man will care for fifty head of cattle with less exertion and unpleasant experience with a silo near-by, than two men will the same number where it is necessary to haul the dry fodder in from the stack, or get it down from a distant mow and run it through a feed cutter. As it is impossible to keep a very large quantity of cut fodder in a mass, without its heating and becoming moldy, it is necessary that the work of cutting the stalks be done at intervals of two or three days throughout the entire winter. The consequent delay of hitching up and unhitching teams, bad weather and extra power required for cutting the dry as compared to green stalks, will carry the cost of cutting in the winter far beyond what it would be in the fall in the continous work of filling the silo, with fair weather and all necessary facilities at hand for rushing the work. If, then, we offset the expense of cutting the dry fodder in the winter with that of cutting the green corn into the silo, the comparative cost of the two systems of preserving feed turn on the losses of dry feeding matter that each have to sustain, or, to put it in another way, will the silo save enough feeding matter over the air-dried system to pay interest on the money invested in the building?

Loss of Dry Feeding Matter.—Taking the latest data obtained at the Wisconsin Experiment Station, by Prof. F. G. Short, on this subject, we find the average loss of dry feeding matter for a series of silos during the winter of 1888 and 89 was 15.94 per cent., while that of the same varieties of corn cut at the same time and given extra careful attention was 16.54 per cent., a difference of nearly one per cent. in favor of the silo, and it should be distinctly remembered that the air-dried fodder that gave these results received extraordinary treatment, and the fall was very favorable for preserving it nicely. It was allowed to stand in small shocks for a month after cutting, then lifted to the top floor of the barn, stood up carefully and examined frequently, to see that it did not heat or mold, which it was not allowed to do.

The ensilage, on the other hand, was preserved in silos 7×8 feet across and 14 feet deep. It will be readily seen that we had to contend with just as much loss in the four corners of these small silos as though the dimensions were three times as great, and, further, ensilage will not pack as readily in a very small silo as it will in a large one. It is plain, therefore, that while it would be a comparatively easy matter to duplicate the results we obtained with the silos, it would be extremely uncertain (and under the conditions that prevail on the average farm absolutely impossible) to preserve fodder in the dry state with as little loss as that found by the chemist at the Experiment Station.

Silo Building Pays.—I conclude, therefore, after ignoring the many other meritorious features of the silo, and assuming that properly-made ensilage is no better feed for stock in the winter than dry corn-stalks, that the mere saving of roughage and land necessary to keep a given number of animals will be sufficient to return a handsome interest on the money invested in the silo building.

Directions for Building.—I wish the reader to understand that the following directions for the building of silos are not offered as the best and only way of proceeding, but rather as one of the ways by which it can be done. It is not only unwise, but an actual hindrance to progress for any one to attempt to give definite and *fixed* directions, for we are constantly learning more and more, and have much yet to learn on the subject of silos and ensilage that calls for modifications here and there in the details of construction and filling.

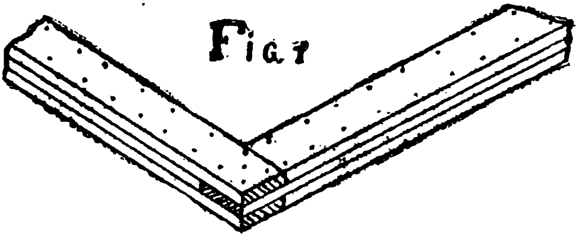
Location.— When possible the silo should be located in the feeding barn, since it not only brings the cost of building within the reach of everyone who is really in need of a silo, but greatly facilitates the handling of the ensilage when feeding it out. Depth in a silo is always preferable to breadth, so that in the case of basement barns it is advisable to let the silo reach from top of barn posts to the ground floor of the basement; a door or opening can then be made from the silo directly into the basement where the ensilage is to be fed. The next best location is adjoining the feeding stable. In most dairy stables the cows are stanchioned in two long rows facing each other, and, whenever it is possible, it should be arranged so that the silo can be entered from the end of this feeding alley; a wooden track can be laid along the center of the feed way and into the silo, upon which a low wheeled car can be operated to distribute the feed. If the silo building is located entirely separate, it should be planned to load the ensilage into a cart which can be driven into the feeding barn, thus delivering the ensilage with little labor directly to the cattle. The idea of convenience should not be lost sight of, for by exercising a little thought and judgment the labor of waiting on the stock through the long feeding season can be greatly reduced.

Form.—In a square silo less lumber is required, and less ensilage is exposed to the walls in proportion to the capacity, than in a long narrow building; it is the part of economy to retain as nearly the form of a cube as the location and other circumstances will admit. Theoretically a circular silo comes the nearest to perfection, for this form requires the minimum amount of material, and does away with the corners, in which there is always more or less decayed ensilage, but as we have had no experience with this form of building, nothing can be said about it at this time.

Building. — The following detailed description of how to build will apply to the outside silo, built separately or as an annex to the stock barn.

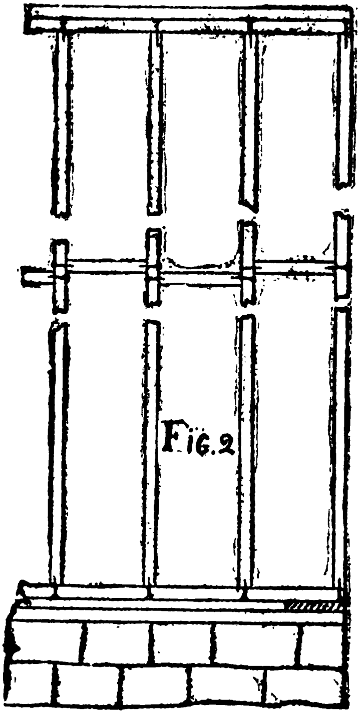
It is always the part of wisdom to provide substantial foundations for farm buildings that are intended to be permanent, and the silo is no exception. An eighteen inch stone wall should be laid deep enough in the ground to be beyond the action of frost, and raised high enough above the surface to admit of sufficient grading to divert all surface water; if the location be a high and well drained one, there will be no necessity for raising the wall more than six inches above the surface. In digging the trenches, throw enough earth inside to raise the silo floor up to the

FIG. 1



SHOWING HOW PLANKS OF SILL ARE JOINED.

top of the stone wall. Upon this stone foundation a sill made of three 2×10 planks should be bedded in morter (see fig. 1). In laying the sill the top plank should not be fastened to the others, but left loose for reasons soon to appear. The studding should be 2×10 plank, preferably 18 feet long. After carefully sawing the studs to a uniform length and squaring both ends, arrange them in a horrizontal position, resting on the edges, and placed sixteen inches apart; they should be supported on a level with and at right angles to the sill upon which the bent is to be raised. Then spike the loose plank of the sill to the foot of the stud; and when all have been firmly fastened, as directed, they should be secured at the top in the same manner. After fastening the studding to sill and plate-planks, the side or end, as the case may be, is ready for raising. After the bent has been raised in a vertical position to its place on top of the other two planks of the sill, the third one that was nailed to the foot of the studding before the bent was raised can be firmly spiked to the lower ones. This first bent can be held in place by temporary stays until the remaining sills, are raised; the plates can then be nailed at the corners, and the skeleton frame is complete; two 2×10 planks will give all the strength necessary for the plate. It will be observed that by following this plan the studs are securely fastened, top and bottom, and the full strength of sill and studding is saved, there being no mortises cut in the sill and no tenons on the studding. After the frame is up, the next thing to be done is to bridge the studding (see fig 2). This is a very simple thing to do, but of so much value in strengthening the walls that it ought never to be omitted in a silo. In case the silo is 18 feet deep, it would be advisable to put in two rows of bridging. By thus spiking planks between the studs, it makes it just as impossible for the studs in the center of the wall to spring out as it is for those nearest the corners. We are now ready to commence lining the silo. Each one can follow his choice as to the outside covering, since it plays an important part in the preservation of the ensilage; some will prefer to use drop-siding or ship-lap, others common lumber, and in some parts of the State it is possible to put on a covering of low-grade shingles cheaper than any other way. It is not necessary, for the preservation of the ensilage, that paper be used on the outside of studding, but to keep out the frost it is advisable to use it, since it



SHOWING FASTENING AND BRIDGING OF STUDDING.

makes the silo much warmer. Since a good deal of moisture rises from the ensilage, it is well to provide for ventilation at the roof. This can be done by openings in the gable ends of the building, or a dormer window in the roof. It is much better to carry off the moist air by ventilation than to have it congeal on the rafters during cold weather, and drop back again when mild days come.

Lining.—Care should be exercised in lining the silo. The lumber for this should have no knot holes, and should be dressed on one side, and is better if edged so that the joints will be reasonably tight. The lumber need not be of uniform width, but boards from eight to ten inches wide are preferable. The inside of the studding is first covered with boards, laid horizontally (see fig. 3), ten penny nails being used; building paper is then tacked over the whole surface. Upon the paper nail a second layer of boards. Care should be taken to break joints, which can be indicated by chalk marks on the paper. This double lining, with paper between, must reach from the top of the silo to the bottom of the sill.

The floor of the silo need be nothing but the earth. As already mentioned, it is a good plan to fill in the silo until the floor is on a level with the top of the stone wall; a layer of straw spread on the bottom before commencing to fill with corn will prevent the loss of any ensilage.

The silo should be tied across the top at two or three places with joists, or a cheap cable; this latter may be made by twisting three strands of galvanized wire which costs about three cents per pound; five pounds will make a cable sufficiently long to reach across an ordinary silo.

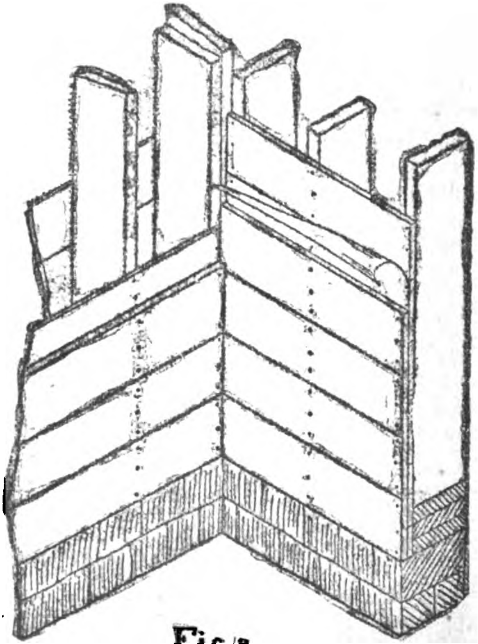


FIG. 3

SHOWING DOUBLE-BOARDING ON INSIDE OF SILO.

If the silo is more than thirty feet long the sills should be secured at two or three places with a cable of this kind, which, as it rests on the ground, is entirely out of the way. The modern silo will not tolerate partitions of any kind; they are relics of the past. There are several methods employed for cutting off the four corners of the silo. Perhaps the simplest plan is to bevel the two edges of a foot wide plank and nail it securely in a vertical position in the corner, and fill the space back of it carefully with sawdust or chaff closely packed. A dormer window in the roof of the silo affords a satisfactory means of getting the corn into the silo in the fall.

The doorway may be formed by cutting out a stud from the sill two-thirds of the way up to the plate. With large silos the doorway should be made sufficiently large to permit the entrance of a cart or some other vehicle for moving the ensilage from the silo to the cattle. There is no necessity for running the doorway to the top of the plate, since the ensilage always settles considerably, and even if it fills the silo above the top of the doorway there is little trouble in digging down just at that point and making an opening. Of the numerous doorways described, the simplest form is probably the best. Tack cleats on each of the studs which forms the sides of the doorway, so that boards six inches wide, running across the doorway come just flush with the inner lining of the silo. If the doorway is wide, set a stud in the middle to prevent the boards springing. Repeat the cleat and boards for the outside wall. During filling, as the ensilage accumulates, place a layer of paper across from cleat to cleat and tack on six inch boards until the doorway is closed; or it may be closed up at once when filling commences and the silo entered by a ladder reaching a doorway on top of the plate. In opening the silo the boards can be knocked off as the ensilage in fed down.

Paint the Inside Walls. — Now that the silo is built the question naturally arises, what is the best and cheapest wood preservative that can be applied to the parts of the silo that come in direct contact with the moist ensilage. An examination of one of the Station's silos that had been treated with a coat of coal-tar shows that one season's exposure to the ensilage had not affected the wood in any manner. The coal-tar possesses another great advantage over ordinary oil paints, there being so much body to it that it readily fills up all cracks in the lining, and aids greatly to make the silo air tight. It is one of the waste products in the manufacture of gas, and can ordinarily be obtained in any quantity at the gas works at three or four dollars a barrel. As it comes from the gas works it is a liquid of about the same consistency as molasses, and it is necessary to burn off considerable of the oil that it contains before it is in a condition to apply to a wall. This burning is a simple process: Pour a quantity of liquid into an iron kettle, set fire to a handful of straw and throw it into the kettle. The tar at once flashes up and burns with great heat. In order to tell when it has become sufficiently reduced, thrust a stick into the blazing kettle, then take it out and plunge it into a pail of cold water. When the tar clinging to the stick has become sufficiently cool to handle, take a particle in the hand and pull it out; if it will string out in fine threads a foot or more long, it has burned long enough, and the fire can be put out by placing any tight covering over the kettle. It usually takes from one-half to three-quarters of an hour to reduce the tar to the proper consistency. This preparation must be applied hot, and it will be necessary to swing the kettle up from the ground, and keep a fire under it until the work is done. The odor and smoke from the hot tar is very disagreeable, but by taking small quantities of the liquid and applying it very hot with mops or whitewash brushes, the surface can be gone over rapidly.

A single season's experience with a wood preservative cannot count for much, but we think very favorably of the method here described, and intend coating the walls of a large silo with coal tar the coming season for an additional test.

Handling Fodder Corn.—The cost of putting corn into the silo depends largely upon the advantage we take of all the little contrivances that are calculated to lighten and reduce the labor of harvesting and drawing to the silo By the use of the old self-rake reaper for cutting in the field, and conveniently equipped wagons for hauling, corn can be cut into the silo for from fifty to seventy-five cents per ton, and there will be no more hard work connected with it than there would be in harvesting a clover or grass crop. Many farms are supplied with low-wheeled wagons or trucks, but when silo-filling time comes there is usually a greater demand for vehicles of this kind than the ordinary farm can supply. A very simple and practical way of equipping the ordinary high-wheeled wagon is shown in fig. 4. This rack was observed in use on the farm of Hon. Hiram Smith, of Sheboygan Falls, in the fall of 1888. It is made of 2×8 plank, 16 feet long, one end of each being placed on top of the forward bolster; the other ends pass under the rear axle and are chained or bolted up tight to it. These two pieces make the foundation of the rack. The wagon is coupled out as far as these planks will allow.

On top of the plank are placed four cross pieces equally distant from each other, as shown in the figure. These cross pieces are 2×4 and should be about 7 feet long; upon these are laid inch boards parallel with the wagon. The load is, of course, placed wholly in front of the rear wheels, but the rack is sufficiently large, and low enough to enable a man to put on a ton of green corn from the ground without having to climb up on the load, or hand it to a second person to deposit.

Length to Cut.—While it is true that ensilage cut fine may pack somewhat closer than that cut long, it is doubtful whether there is any material gain in the operation; by cutting fine more of the inner parts of the stalks are exposed to the air, and perhaps more fermentation induced than with longer cuts. So far as our experience goes, there is nothing gained by cutting fodder fine instead of coarse, provided that the cattle eat it equally well in both cases; the gain in cutting, which is often

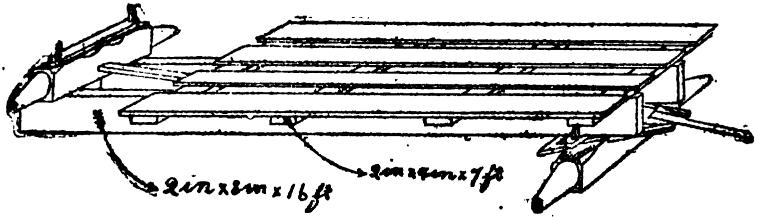


Fig. 4. RACK FOR DRAWING FODDER CORN.

very great, comes mainly from getting consumed that which would otherwise be wasted. In the case of ensilage, there being no necessity for cutting the fodder in order to have it eaten, the length of the cut appears to turn upon somewhat closer packing, on the one side, and extra expense of fine cutting on the other. It is recommended that cuts as long as two or three inches be tried with some of the fodder and the results reported; if such long cuts are satisfactory the expense of making ensilage will be considerably decreased. With ample power and a good feed cutter it will be more economical to cut fodder and run it into the silo by a carrier than to attempt to fill with long fodder.

Use of a Chute.—The carrier should deliver the cut corn as near the middle of the pit as possible. Until the silo is nearly filled a chute can be used to convey the ensilage still further toward the desired position in the pit. The chute should have sufficient slant so that the cut corn slides off readily. By changing the direction of the chute from time to time the labor of distributing the cut corn can be reduced to the minimum.

Filling the Silo.—When corn has reached the proper stage of maturity, it is not necessary that it be wilted before putting into the silo in order to make the so-called sweet ensilage; only the immature fodder needs wilting. Such should be wilted from 24 to 48 hours, if possible, before cutting into the silo. Varieties that mature, if left until the ears begin to glaze, can be put into the silo immediately after being cut, with satisfactory results, provided there is no outside moisture on the corn as it goes into the silo, nor is it necessary to suspend operations every day in order to let the ensilage in the silo reach a certain temperature before filling can be continued. If the corn is sufficiently mature, and is put into the silo without rain or dew, there need be no fear about the quality of the ensilage, whether put in slowly or rapidly. At the Station last fall we filled a pit with fresh, sufficiently matured corn in one day, and had first-class sweet ensilage. Recent experience has taught that there is a limit to putting dry or excessively wilted corn into the silo, beyond which we dare not go. When the corn has lost enough water to cause the leaves to rustle and break in handling, it does not pack closely enough in the silo to exclude the air, and, in opening the pit, it will be found that the ensilage is fire fanged and permeated all through with a white mold. There is another reason why the corn should not be allowed to become so dry, even if there was no trouble about its keeping in the silo; when we put dry corn into the silo we have lost the succulent feature of the ensilage that makes it especially desirable. Having once commenced to fill the silo the work can be crowded right along by observing the conditions mentioned.

The practice, each morning during filling, of removing the cold ensilage from along the walls and corners, and substituting that which is warm from the middle of the mass, seems a reasonable one and worthy of further trial. That it is not essential, however, to good sweet ensilage, our own experience has proved.

In the case of an accident or breakdown it will do no harm to suspend work for a day or two, but if left longer than this the ensilage, to a depth of two or three inches, usually begins to mold. When filling is completed a foot and one half of chaffed straw, marsh hay or cornstalks will make a sufficient covering. The use of weights is now about obsolete. The silo should be examined daily for a couple of weeks, and the covering pressed down until the settling has ceased.

Two Crops in the Same Silo.—The question is often asked if one crop can be placed on top of another in the silo, provided that the first has only partially filled it? Most certainly, if one crop, as clover, for example, only partly fills the silo. When the corn crop has matured, the covering of the clover can be removed or left on as desired and the other crop placed on top of it. By filling at different times much more can be got into the silo than if a single crop is placed therein by rapid filling. Even with the slow filling; ensilage settles considerably after the silo is closed up; with very rapid filling it may settle as much as two-fifths or one-half. Under any system it is well to allow two or three days settling at the last and filling up again so as to get in all the feed possible.

Clover Ensilage.—Too much cannot be said in favor of clover for the silo. There has been considerable hesitation about preserving clover in this way; chiefly perhaps, on account of the extremely offensive ensilage which resulted from some of the first experiments in ensiloing clover. As in the case of the first corn ensilage, the clover was put into the silo in a watery and immature condition. The result was a watery ensilage of very offensive odor. By allowing the clover to become more mature, and cutting it when the dew is off, it is found that a bright, sweet, palatable ensilage can be made. One of the silos at the Station was filled in the summer of 1888. The clover was first growth, and owing to the drouth had become rather woody. The only precautions taken were to see that the dew was dried off before cutting, and that, in filling, the clover was evenly distributed, and well tramped down in the corners and along the sides. The silo was filled rapidly and immediately covered. On opening the silo the contents were found to be well preserved, with a slight aromatic odor, and but a trace of acidity. It was eagerly eaten by the cattle, and formed a valuable addition to their rations.

Profitable farming cannot be carried on without the help of this wonderful plant; we all know how difficult it is to cure into hay and get it just right, but by putting it in the silo the risk and expense of handling the crop is greatly reduced. Sunny days are not essential when putting clover into the silo. The mower can be started as soon as the dew has dried off in the morning, and by noon enough will be cut to keep two men with a team and wagon busy all the afternoon hauling the fresh cut clover and placing it in the silo. It is not necessary, in putting clover into the silo to run it through a cutting machine, so that the expense of filling a silo with this crop is very light. To those who appreciate the advantage of having a succulent food in the winter, and are willing to incur the expense of building a silo, but are restrained by the cost of the machinery necessary for reducing and elevating corn, we would say, build a silo and fill it with clover.

HOW I BECAME A DAIRY FARMER.

By C. P. GOODRICH, Ft. Atkinson, Wis.

The Key to Success.—On looking about me, I discovered that of the great mass of those who were keeping cows the majority were keeping them for very small pay, and some at a positive loss, while a few were making a success of the business, and not only were enriching their farms but also filling their pockets. I noticed that the successful ones were the ones who had made the business a study; had learned all they could about it and attended strictly to all the minute details. No man need think of succeeding in keeping cows unless he is willing to give his attention to it, and care at least as much for the comfort of his cows as he does for his own comfort. He can't turn his cows out of the barn in the morning, go to town, and, because a snow-storm begins, stay there until night, awaiting for the storm to cease, and then when he gets home, cold and hungry, warm himself and eat his supper while his cows are shivering out-of-doors. If his conscience will let him do that he is no man for dairying.

Seeking Information.—Although I had milked cows and had the care of them, to some extent, since my boyhood, I found I was very ignorant on many of the most important points. I set myself the task of learning the business. I went to reading everything I could get on the subject, attended dairy conventions; talked with and learned much from those who were successful; obtained the results of experiments made by others, and experimented some myself. My progress was slow, but I kept learning. I improved my cows by care and selection in breeding, and by better feeding; I learned something of how to handle the milk and how to make and market butter.

At first the yearly earnings of my cows were but little more than the cost of their feed, leaving but little for the labor. But there was a gradual improvement each year, until now, after allowing a good price for the feed and labor, I have a good profit. Besides, *my land is growing richer all the time*, and I hope I am not done yet. I have not learned it all by a long way. I firmly believe that if I continue in the business I shall still further increase my profits. One thing is certain, that if I am to hold my own I must keep learning—must keep up with the times—or, in this age of progress, I shall be left behind.

Some Things I Have Learned.—First, as to the kind of cows we must have for the production of milk: We must have those that have been bred and reared for that purpose. Among our common cows—they are a mixture of many different breeds—we may find some good dairy animals, and with such to start with, one may, by careful breeding and raising the heifers from only the best cows, and by *feeding* for milk, and milking and handling in a way to stimulate the greatest production of rich milk, obtain a herd, in time, having a fixed character as milk producers. It will be found that the longer this course is pursued, if in the selection regard is only had for performance at the pail, the further the type will be from the beef type. But why not start out with some one of the milk breeds, that have been bred and used for generations exclusively for the production of milk, rather than spend a lifetime to create such a breed? Better by far to start at once with some animals of some one of the best milking breeds—Jerseys, Guernseys, Holsteins, or perhaps some other breed. I don't wish to advocate the claims of *any* particular breed, only that they must have a good milking record for generations back.

The General-Purpose Cow. —I used to believe somewhat in the general-purpose cow; believed it might be possible to raise such an animal, so many men said it was. I had graded up to some extent with Jerseys. They did well in giving milk but they were so small and scrawny, I did not feel satisfied. I did so like to see a good, large, smooth, square-built cow, that in an evil hour I determined to cross back to the Shorthorns to see if I could not produce larger and more beefy animals and still retain the milking qualities. I obtained an animal of what was said to be a remarkable milking family of that breed. The first year I raised seven heifer calves from my best cows. They were beauties, according to my idea then, and it would have taken a great deal of money to have bought them. I thought I had just struck it. Some of them came in before they were two years old. One of their calves I wished to make veal of, and it took two of the heifers to give milk enough to fatten him, and then he did not seem to have all he wanted. I fed them higher to try to stimulate them to give more milk, but it was of no use. After they had given milk two months I sold them for beef at $4.50 per hundred, and they weighed nearly 900 pounds each at just two years old. They had not given milk enough to prevent their laying on flesh fast. Well, they all, with one exception, turned out about the same, and they had to go.

I had another crop of heifers of the same kind that came in the next year, and they turned out about the same. There were just two out of both lots of heifers that proved worth keeping for milk, and they were both calves of a grade Jersey cow who seemed to have the power of stamping her progeny with her own qualities, both as to color and form and milk production. Now, this happened only four years ago and it has served to completely knock the general-purpose idea out of my head.

Feeding for Milk.—Whatever is produced by any animal comes from its food. It is plain that if we wish to produce milk, the food must contain all the component elements of milk, and to produce milk in the greatest possible quantity from a given animal, these elements must be in their just proportions and be fed in quantities up to the full capacity of the animal's digestion and milk-producing machinery. The chemist steps in now and, by analyzing different kinds of food, formulates a ration which, in his judgment, will produce the desired result. His work may be a great help to us by enabling us to experiment understandingly, but it takes practical experience to determine the correctness of his theories; for the appetite of the cow, her likes and dislikes, her ability to digest and assimilate certain kind of food in certain forms and under certain circumstances must all be determined by experiment. Another thing of the utmost importance to the dairyman is the relation of the cost of food to the value of the product. The proper elements of food must be obtained at the least possible cost in money and labor to make the business profitable.

Variety of Food.—I believe the cow herself to be a pretty good chemist, and that nature will prompt her to select her proper food if she has opportunity. Therefore she should have as great a variety of food, both winter and summer, as possible. That she loves a variety could scarcely escape the notice of the most careless. If her pasture is all clover, except a little June grass, or prairie grass in the fence corners, see how closely the fence corners are gnawed down while the clover grows up tall and rank. If, on the other hand, her pasture contains but a small patch of clover, see how much closer that is fed down than the rest of the pasture. If, in winter, she is fed but for a short time exclusively on one kind of hay, no matter how good the quality, see how quickly she will leave it when offered some other kind — corn-fodder, or even straw,—and how greedily she will eat of the new kind of fodder, though its quality may not be of the best. Some otherwise sensible men signally fail in keeping cows, especially in winter, by not gratifying this very natural desire for variety. At pasture they have a better opportunity to obtain a variety.

Not long since I visited a farmer who keeps a large stock of cattle, some of them blooded stock, and he tries to farm it so as to make money. He casually remarked that he had fed no hay yet, although it was the last of December. He said he always fed his cornstalks first so as to get them out of the way before they were covered deep with snow. Next he fed his marsh hay, and when that was gone he fed his timothy hay. He liked to keep that till spring. He then remarked: "Somehow nuther I never could git nothin' like what you fellers tell o' gettin' out o' cows in winter, and still I've fed 'em lots o' corn-meal aready." I thought, "no wonder," but said nothing. (I forgot to mention that his blooded stock were Holsteins, some of which he paid $200 and over apiece for.)

Proper Quantity to Feed.—The next question to be considered after having determined the kinds of food to be given and how to provide the necessary variety, is to determine the *quantity* it is the most profitable to feed. In my opinion, it should be the greatest quantity the cow will consume and properly digest and assimilate. Of course great care should be exercised in feeding animals that have been under-fed. Increase the quantity gradually, and at no time over-feed so as to injure the cow's digestion, for that would be ruinous. The best way is to accustom her to generous feeding while young, and *never* starve her.

It takes a certain amount of food to sustain life. It is said this is about two-thirds of a full ration. By full ration I suppose is meant all that the cow can consume and digest. Now, if just this food of support is given a cow each day in a year, there can be no growth, no increase in flesh, in fact, nothing produced. So that at the end of the year all you have is the same size of carcass, only it is a year older, and all the food and labor is worse than thrown away. If this view is correct, we cannot avoid the conclusion that the greater the amount of proper food that is consumed and digested above the food of support, the greater the ratio of the product to the the whole amount of food consumed. You may say that all this is simply theory, but my own experience convinces me that it is a *correct* theory.

My Dairy in 1875.—The year 1875 was the first in which I kept any account of the proceeds of my dairy. That year my cows produced what was equal to about 150 lbs. of butter each, and the total proceeds were $38 each. I kept my cows about as others who called themselves good farmers did. They had good pasture, and gave a good quantity of milk while the grass was fresh, but shrank badly in the fall and dried up early in winter. I fed good hay and corn fodder, but little grain in winter. The cost of feed I estimated for the year at about $25 each.

My Dairy in 1876.—The next year—1876—I fed better, feeding bran and grain during the fall and fore part of winter and early spring, and my cows produced 249 lbs. of butter each, and the total proceeds were $77 each. I had produced about 100 lbs. more of butter per cow, and the increased cost of feed was not more than $6 per cow. (Bran was cheap then.)

The next year I fed still better, with another increase in profits. I kept improving steadily, until now I intend to feed up to the full capacity of each cow; and I must say that, with every increase of feed, for every dollar laid out, I have got back *more than two dollars*. This, of course, would not be possible, if the cows were of the beef type and turned their food into flesh. In all my talk about high feeding I assume that the feed is to be given to a true dairy animal that will make it into rich milk.

The Way I Feed—My cows now is to let them have good pasture in summer, with a variety of grasses. At all times they have free access to good, pure water, which is warmed in winter. They have all the salt they want.

When they are put into milk, there is in the mangers some good early-cut-hay, of which they always eat a little, even when grass is the best: After milking they are fed bran. In the fall they have fodder-corn besides the other feed. During the winter they have all the clover hay (with sometimes meadow hay or millet), all the cut corn fodder and all the straw they will eat, with from 10 to 15 pounds of bran and meal per day. I drop off nearly all the grain ration about two months before calving, as I have found by continuing it too long there is more danger of milk fever. I think as good a grain ration as I can get, is one-half the weight wheat bran, ¼ oats, ground, and ¼ corn-meal; but if oats and corn are much higher than bran, they can be left out, and the whole weight be of bran, and be nearly if not quite as good.

Increasing the Capacity for Milk.—I do not wish to be understood as claiming that a cow can be brought up from 150 lbs. a year to 350 lbs. immediately as the result of better feeding. The improvement will be gradual, taking some years to reach the highest limit. Nor do I claim that the result in my case is *wholly* to be attributed to better feeding, though mainly so. Better handling and selection in breeding have done something toward the improvement. What I do claim is this—that the capacity of a cow for giving milk can, by the right kind of feeding and handling, be increased both as to quantity and richness in butter fat, from year to year, until she is at least 8 years old, and that a family or breed of cows, by the same means, can be so improved in this respect that each generation will be better than the preceding one, even without the introduction of any better blood. In other words, I will say that the more and the richer milk you manage to make a cow give, the more and richer milk she *can* give, as you develop the capacity to do so, and she will transmit these qualities, in some measure, to her progeny. Animal nature has the power to gradually adapt itself to its surroundings, and to the uses to which it is put.

"Run-Out" Cows.—As good care and

feeding will improve any breed, so starving and hard fare will cause the best breed in the world to degenerate. How often do we hear it said that the stock of certain men has "run out." A cow that has always been poorly fed, and is descended from poorly fed ancestors can not possibly be a good cow. Her ability to withstand hard fare may have been developed so that you may call her hardy, but it is at the expense of her milking qualities. Now, I don't want hardy cows in the sense that is generally understood.

The Nervous Theory.—A good dairy cow is a wonderfully delicate and sensitive piece of animal machinery. The brain and nervous system are so intimately connected with the milk-giving functions that whatever excites the nerves through the brain affects the milk, usually—but not always—lessening the quantity of milk, but *always* diminishing the per cent. of butter fat to a greater or less extent, according to the degree of excitement. This being the case, it is necessary that a cow to do her best must be *just as contented and happy* as it is possible to make her. She must not be exposed to storms or inclement weather, or any conditions that will give her discomfort or pain. She must have no anxiety in regard to food or drink, which should be given at regular times and in quantity and kind to suit her appetite and needs.

The Milking.—This I consider the most important operation in dairying. It should be done by the same person, in the same manner, and under the same circumstances every time. I care not whether you feed before, at the same time, or after you milk, if you do the same every time. I care not whether you take hold with the whole hand or strip with thumb and finger, or milk one side together, or milk diagonally, so long as you do it in a way that will quickly get *all* the milk, and in a way that *best pleases the cow*, and so long as you do the same way every time. If there are several cows they must be milked in the same order every time. If you are in the habit of beginning at one end of the line and going through in regular order you will notice frequently, if the cows are giving a full flow of milk, about the time you get done with the first one the milk will begin to drop from the second one. She is then ready to be milked—expects to be milked. Do not disappoint her by going to the other end of the line. If you do so, and come back to her after half an hour, you will find that she will not "give down" as readily, and that you will very likely get less and poorer milk than if you had milked when her turn should have come.

You may sing or whistle while milking if you like, if you do the same every time. You may sing different tunes if you wish, but sing the same tune to each cow every time. If you sing "old hundred" to the "Yankee doodle" cow, your hands, which will be likely to keep time with the tune, will have a slower motion, your milking will be different, the cow not so well pleased and the yield of milk poorer.

Effects of Excitement.—Now, I know that some of you are saying to yourselves that you don't believe a word of such stuff, that it is all nonsense. Others are saying, "there may be something in what has been said, but this is getting down too fine." But you all know that it is the *fine* workman in any business who makes the most money and commands the highest wages; not the rough, coarse workman.

Every one who has been in the habit of testing the milk of cows has found an unaccountable variation from day to day in the per cent. of butter fat in the milk of the same cow, and also that the butter churned from the milk of a herd of cows varies almost daily. In my opinion, these otherwise unaccountable variations are mainly caused by some worry or nervous excitement of the cows.

Now, this is not a theory that I have adopted *first* and then set to work to hunt up facts to prove it afterward. The *facts* came to knowledge first, and I have labored patiently to find the cause. I believe if *great* excitement will produce very marked effects, less excitement will produce similar effects, only in a less degree, on the principle that if two drinks will make a man drunk one drink will make him half drunk.

A few months ago I bought a seven-eighths Jersey cow of a man who said she gave remarkably rich milk. She was the only cow he had, and was well fed, so he had a chance to know. The next day after getting her home I tested her. It took 23 lbs. of milk to make a pound of butter. Two weeks after, when she had become well contented in her new home, I tested her again and it took but 11½ lbs. of milk to make one of butter. There had been but a slight variation in the daily quantity of milk.

Two years ago I had a fine cow that become, one day, terribly excited; in fact she was in a perfect frenzy. The next day it took 40 lbs. of her milk (she was giving 40 lbs. a day) to make a pound of butter. Before that and three days after that, when she was perfectly quiet, it took but 14 lbs. of milk to one of butter. These were cows of a highly nervous organization. I could give many more similar instances, though not all of them so pronounced, but these will do.

Now, these are some of the facts in relation to this subject that have come under my own observation, and they mean something — they mean that the man who is kind and gentle with his cows and careful of their comfort will get well paid for it, and the man who is harsh and rough and cruel with his cows will find his profits small indeed. It is very costly having cows brought from pasture on the run with a dog at their heels. The angry milker who mauls a cow with his stool and raises a general excitement in the stable is knocking, it may be, a dollar out of the owner's pocket with every blow he strikes. You may not fully accept this nervous theory, but if what I have said will cause any man to think, observe and investigate in relation to it, I shall be satisfied, for he will learn some things by which he may profit immensely.

SUCCESSFUL CORN CULTURE.

By O. STRAHL, River Falls, Wis.

A National Crop.—Corn is our national crop; it is king. Its acreage is about 55 per cent. of all the cereals, and in quantity it is four or five times that of wheat, averaging over sixteen hundred millions bushels for eight years past, and supposed to foot up to two thousand millions this year—a quantity so enormous that it would take 80,000,000 of teams at 50 bushels each, before shelling, to draw it, and which, on the road in a string, one to every two rods, would reach 500,000 miles, to the moon and back and once around the earth.

Yield.—The yield is much greater per acre in the northern States than in the southern. Ohio, Indiana, Illinois, Iowa, Wisconsin, Missouri, Kansas and Nebraska average about 26 bushels per acre, usually, while Alabama, Georgia, the Virginias and Carolinas, range all the way from 11 to 18 bushels. It is not an important crop in Europe; the United States produces three-fourths of all the corn in the world.

Climate.—Our climate here in Wisconsin, although quite well up north, is well suited to producing good crops; usually just enough heat and moisture to mature middling-sized corn in the highest degree of perfection.

Success in Raising.—In corn raising, success depends largely in getting good ready. We must lay plans and calculate beforehand; we must commence away back last year and save the seed out of that crop, long before any preparation of the soil begins—say about the first week in September. Just as it begins to dent, and some of the outer husks indicate ripeness, is the best time to select, for we want those ears that ripen first, other things being to suit us; we want good stock, as in animals; we want a good breed of corn, to suit the climate. It must be vigorous and hardy, rather low and stubbed, with one good ear rather low down. Two or more ears are a failure; neither one is apt to be good. We select the kind of corn as to character of grain, cob, etc., that suits us; deep grained dent corn is my choice. I have the yellow deep grained Hackberry and the Powell Illinois white corn; the yellow is the earlier and yields about as much per acre. It is not quite so large but will bear to stand a little thicker.

Saving for Seed.—To ascertain my preference, I counted out representative ears of both varieties, weighed each, and shelled it, weighed cob and shelled corn, and found but little difference as to amount of cob and corn—about a half pound in a hundred in favor of the yellow; but I found a great deal more moisture in the white corn than outside appearances indicated, fully establishing the fact that the yellow is a week or more the earlier.

The seed gathered early is full of juice or sap, and must be dried out thoroughly, cob and all, before it freezes. To do this I tie it in bunches with twine or wire, ten or twelve ears together, and hang as near the kitchen stove-pipe as my wife will let me. If kept a little warm, in two or three weeks it will do to put away and, if thoroughly dry, freezing will not hurt it. It may be shelled if it suits one best to take care of it in that way. It is all right now, and we can warrant it, as nothing but downright neglect will thwart its energy; next year's crop is there in embyro, snug and sure.

Preparing the Ground—Plowing.—Now, then, we will get the ground in order. Either fall or spring plowing will do, as it may suit our convenience. The fall plowed land may become packed and hard by numerous storms; if so, it must be mellowed before planting by re-plowing, the use of the disc or spring tooth harrow, or something that will make it absolutely mellow, or else it will be mere chance if we get a good crop, for it is scarcely possible to thoroughly pulverize the soil after the seed is in without disturbing it.

Weeds do not seem to start quite so quickly and saucily on fall plowing unless re-plowed in the spring. Then look out, and hurry up, too, for of all the unwelcome guests of the young corn the early weed is the worst. It seems as if weed seeds after lying under ground for six months or a year, or it may be several years, being turned up to the surface, envy their neighbors who have had a better chance to grow and pester us, and start on in two-forty haste to make up for being kept under so long. Well, if a stich in time saves nine, a lick in a corn-field addicted to weeds saves 99 or the whole.

Any of our soils here will bring first-rate corn. We have quite a variety, too—sandy loam and absolute clay often on the same quarter section, and the wise farmer, in his course of rotation, handles one and the other to suit the dictates of good judgment. Therefore, we cannot write down a rule that would suit for the handling of all these various soils in their several conditions. Some are thin and some are deep. We must be careful and not turn up much of the cold sub-soil in plowing, or it will injure the crops. Deep loam, porous away down, will bear deep plowing—up to the beam if the team don't object—but this land is good for a pretty fair crop with half a chance.

I would plow on my farm, which is between real loam and real clay, with clay sub-soil seven or eight inches, for spring work, when the ground is liable to be wetish; would be very careful to have it dry enough to work well and not pack under the horses' feet or against the mold-boards, or it will be cloddy, and clods give out no nutriment; consequently such amount of the soil as these clods contain is a dead loss until time or storm, or mechanical contrivances, dissolve them, which may not occur until late in the summer—after it is too late to benefit the crop. Therefore, we should handle our ground carefully so as not to make clods.

Early planting, is surest, say from the 5th to the 12th of May.

Planting.—Having worked diligently with plow, harrows, rollers and such implements as the occasion demands, we will mark the ground both ways, especially if there is danger of weeds, about three feet eight inches, and plant with the hand planter, probably four to five kernels in a hill, so as to be pretty sure of a stand of three stalks, on the average. Kernels of corn vary so in size, even in the same variety, that it is not possible to get a machine to do it as nicely as counting, but the machine-planted, if carefully done, comes up more surely and has a firmer foothold. At first, to withstand tough handling in case of harrowing, we should try to do the planting in two days or less, so as to have an even start all over the piece.

Harrowing.—As we only left the slanting fine-tooth harrow when we had to, to mark the ground for the planter, we will put the team right to it again and go over it once each way, and repeat one way in a week or so, or just as the corn comes up. Then it must be harrowed once or twice more by the time it is up four or five inches. After this the fine-tooth single cultivator should do the work, running as close to the corn as can be without pulling it out, and very shallow, two inches or less. About four times with this cultivator at intervals of eight or ten days will put it up to the period of the tassel beginning to make its appearance, when it will be time to cease, and let it take care of itself. Bad weather may prevent the carrying out of this plan punctually.

Stirring the Soil.—If the season is dry, the oftener we stir the top soil so as to keep it loose and porous the more moisture it will receive by capillary attraction from the sub-soil and atmosphere and thus render more nourishment to the crop. We must also stir the ground as soon as it will do after every heavy rain, to prevent the formation of a crust on top.

I do not believe in cutting and breaking the roots. I think it injures corn or any plant to cut and mutilate its roots, especially in dry, hot weather, so as to make the plant wilt and show signs of being crippled.

When I was a boy this deep stirring of the soil was thought to be the thing for dry, hot weather, but it looks to me now a little akin to cruelty to mutilate a plant and make it sick at the time when the recuperative resources of nature are temporarily withheld. I therefore say do your deep work before planting. Shallow culture and lots of it is safety.

Smut.—Some think that wet weather induces smut, but we read of frequent instances of its prevalence in dry seasons, at any rate it does not originate spontaneously but from seed or spores, as they are called. These spores are very light, even lighter than common dust, and thus float about in the air and light, and grow, retaining all the time, like the chinch bug, wonderful vitality. Barnyard manure, where infected fodder has been fed out, is a good medium for keeping the supply up, for even though it be eaten it will pass through animals, and retain its vitality. The remedy here, now, where it has but a slight hold on corn might be found in going through the corn before it gets dry and light enough to float off in the air, cut it off and collect and burn it; this would be practicable now, but not very effective without joint action all around the neighborhood. This smut is evidently on the gain, and may develop into a formidable injury. Let us beware.

IMPORTANCE OF SHEEP ON THE FARM.

By S. A. PELTON, Reedsburg, Wis.

Getting out of Sheep.—The census of 1885 gives Sauk County 37,680 sheep and lambs, or 1 7-10 to a person, at a valuation of $1.54 per head. Wisconsin has 1,429,137 sheep, or less than one sheep to a person, at a valuation of $1.64 per head. This surely is not an over-production for the county or State; but, nevertheless, there was a general outcry all along the line that sheep did not pay. The city papers took up the cry, and flock after flock was sold in Chicago, and the proceeds used to purchase Minneapolis bran and shorts, to fatten pork and beef at a far greater loss than was imagined to have been real in the first transaction.

The Branch of Farming to Pursue.—The farmers of Sauk County are engaged in mixed husbandry, and some are so badly mixed that they cannot tell which branch pays the best; but, judging from the experience of the past, that branch which for a term of years has yielded a fair profit above the general outlay is the one to hold fast to.

It is not absolutely necessary for a farmer to ape the methods of his neighbors. Location, soil, and liking for the occupation should, in a measure, determine his drift. No special scientific education is an absolute guarantee of success in any line of farming. "Where there's a will there's a way," "business experience is an apt teacher," are maxims that will apply with full force in practice. I would not advise any one to quit dairying, fattening beef, pork, or breeding horses, when one has buildings and apparatus necessary to produce the requisite results. Occasionally changes must be made, but would it not be better to change methods than to change the line of farming?

Sheep on Rough Land.—If a person has a rough and broken farm, and small capital, he can hardly strike a better opportunity than to secure a few sheep. They will be a nucleus around which will gather, under good management, a large flock in a short time; an investment that will pay interest at shearing time at the rate of 100 per cent., and dividends from each lamb, besides leaving the pasture lot fertilized in the best possible manner for a crop of winter wheat.

Mutton the First Consideration.—Mutton first and wool second should be the aim of every flockmaster. While opinions differ as to breed, the farmer can illy afford not to heed the fact that the market demands that certain conditions be fulfilled. Feed influences breed to a great extent, and care likewise leaves its ear-marks unmistakably prominent in every flock.

Yarding.—Many farmers have lost the increase of their flock by yarding sheep, horses, cattle and hogs together. Lambs do not thrive well with hogs, nor do sheep come up to the standard of expectation when trampled on by horses, or hooked by cattle. I would not advise any one to turn a flock of sheep and lambs into a field in spring and leave them there until fall. The chances are that none will be found when the owner calls for them.

Farming Requires Thought.—Farming is a business that requires thought and forethought to manage skillfully the many problems that constantly arise as to the best methods of improving the fertility of our soils, and at the same time leave us a fair and living profit. It is an important consideration to keep stock that is best adapted to your peculiar conditions. When help is scarce, sheep offer opportunities to relieve one of a large amount of labor that is required in the proper management of the dairy and its kindred associations.

Mixed Husbandry.—Much has been said about special farming by the agricultural press, and by specialists, but often they neglect to inform the public that their start in business was peculiarly favored by various circumstances. I believe in mixed husbandry for the farmers of Sauk County. I also believe that the specialist has his place, and further, that no one method of farming followed for a great length of time is sure of the fullest success unless the power behind the throne makes it a success.

The Hand at the Helm.—Sheep husbandry, like any other industry, must have the right hand at the helm to make it profitable. One must have a liking for it and make it a study. Blood will tell, and feed will tell. One person may take a flock of sheep and make them pay, while another may lose by the operation. The shortest rule in application is to breed well, feed well and then sell well. There is profit in so doing; there is loss in the reverse.

CHICKENS FROM SHELL TO GRIDDLE.

By W. H. ROSE, Boscobel, Wis.

Care of Fowls and Eggs.—If we depend on raising our own fowls, we must first get the eggs, and in order to get them we must first provide ourselves with the variety of fowls that are best adapted to egg production; then care for, and feed the proper food to enable the fowls to lay the eggs. If it be in the winter season, when the fowls are shut up all the time, great pains must be taken in gathering the eggs before they are chilled; also in giving the fowls some kind of green food, because eighty out of every one hundred eggs will fail to hatch when the hens are confined and no green food is provided. Right here is where a great many living in villages fail. Even in the summer season they are obliged to shut up their hens to keep them out of their neighbors' gardens, and they either forget or neglect to throw them something green each day, and the consequences are lousy hens and infertile eggs.

Feeding the Chicks.—We find by careful study of the subject that the egg is composed largely of albumen and there is scarcely any albumen in corn, but a large per cent. in wheat. It lies just inside the outer skin of the wheat; consequently wheat bran is one of the best foods to produce eggs. Feed it hot and wet, feed it dry—any way the chicks like it best. Oats are good; small, shrunken wheat is good and buckwheat is splendid. My plan of feeding is this: Take boiling water, add a little salt, a little cayenne pepper and a little sulphur; then stir in some ground feed, making a kind of mash, and add wheat bran until the mass will crumble and not be sticky. By the time you have stirred this up it will not be too hot and will be greatly relished. This makes a good breakfast and should always be fed early and in V-shaped troughs. For dinner I scatter a little shrunken wheat or screenings among the litter (previously provided) and let them hunt for it. If it occupies their time for three hours all the better. Exercise creates warmth and warmth means eggs, especially in the winter season, and that is when we want them. For supper a full feed of corn or wheat should be given just before they go to roost.

Make Hens Lay.—Some people suppose and even claim that if hens lay in the winter season they will lay less in the summer, or, in other words, that they will lay only just so many eggs in a year. It is a mistake. The hen is an educated being. In her native state she laid nine, eleven or thirteen eggs, became broody, sat upon them, hatched out a portion of them and then guarded the chicks for six months. Now we have hens laying 185 eggs in a year and rearing a brood of chickens besides. True, a hen will lay only a certain number of eggs and then become broody, but she can easily be broken up and made to commence laying again. Thus by a little study and care she can be made to contribute her share toward filling the egg basket three-fourths of the year. Of course, she must moult, and no power that I know of will induce her to lay any eggs during that period. It takes all her vitality to produce the new crop of feathers. Hens begin to shed their feathers early in the fall and don't complete their plumage until about December 1st. You will readily see that if a hen lays no eggs in the winter, and does not begin before the middle of April, she has no time to lay her 185 eggs, laying usually one egg every other day. The fact is the hen is simply an egg machine, and if fed the proper food, and carefuly cared for, she must either lay or die. Many of the wild birds lay an even number of egg—two, four or six—before if unmolested, they will become broody and set upon them. If you remove one of them, they will lay one more before beginning their incubation process, showing conclusively that all birds may be compelled to lay more eggs than nature intended they should.

Eggs for Hatching.—Remove all the eggs from the nest every day. They will hatch very well when three weeks old. This will prevent their becoming broken, or chilled by frost, and the hen will think every day she goes to the nest that she has just begun to lay her usual thirteen to fifteen eggs, and never knows when she is through. Eggs intended for hatching purposes should be kept where there is an even temperature and turned over every day. They will hatch very well when three weeks old.

Hatching Chicks.—To hatch chicks successfully you must have a place to set the hens in separate from the flock. Have it large enough to accomodate as many hens as you wish to set; make the nests large and smooth, on or near the ground. If possible, set three or four hens at a time, giving each hen nine, eleven or thirteen eggs, acccording to the size of the hen. When one week has elapsed go in the evening armed with an egg tester and a lantern; examine every egg, throw out the infertile ones and give the fertile ones to one, two or three hens, as required to cover them, and supply the others with fresh eggs. Thus you may hatch with four hens as many chicks as you would ordinarily with eight. When broody hens are scarce (and that is the case generally in the winter), I sometimes compel them to set six weeks. Keep the setting hens quiet. Arrange so that whenever they come off their nests they may find a drink and a good square meal handy. If two or three come off at once, and on going back should make a mistake and get into the wrong pew it will make no difference. When they settle down to business they will make no mistakes, and then is the time you should give them the eggs you wish them to hatch. It is always well to give them some china or poor eggs to set on until all is quiet. It is often the case where biddy is too attentive to business, and sets on her eggs too long at a time, that the eggs are spoiled; or, in other words, the embryo chicks are killed. Watch her, and if she does not come off at least every other day, gently take her off long enough for the eggs to cool. If any of the eggs get broken there is no time to lose. Take some milk-warm water and wash them carefully, for if any of the broken ones should smear the good ones, it will effectually close the pores and the chicks will die. They must breathe the same as any other animal. From the 19th to the 21st day you may expect some of the little chicks to break the shells, and if you have sprinkled the eggs two or three times in the last week with slightly warmed water they will break them all the more readily. The better work the little fellow makes in getting out of his prison cell the better are his chances for life. If he pecks a crease clear around the shell and comes out spry his chances are good, but if he simply pecks a small hole in one side of the shell and begins to peep until you remove the shell, the chances are he won't live a week. Well, better dead than alive, for who ever saw a sickly little chicken get well and grow?

Care of Young Chicks.--When the first to hatch are twenty-four hours old remove them to some dry place. Take one of the hens along and give her all she can hover conveniently. The more you give her the prouder she will feel. Perhaps twenty is about right for an ordinary-sized hen. Place the remainder of the eggs under the other hens, and as fast as there are enough for a brood take them out and so on until they are all hatched. Remember always that the little chick needs absolutely nothing to eat or drink for the first twenty-four hours of its life. After this feed very sparingly of something light. Perhaps the very best thing to feed for the first week is hard boiled eggs, chopped fine, shell and all, and the infertile ones we threw out two weeks ago are just as good for this purpose as fresh ones. Bread crumbs and crackers soaked in milk are also very good for the little chicks: In a few days small seeds, shrunken wheat, etc., are good. Sour milk, or clabber, as we call it, is splendid. In order to give some sulphur, salt, pepper, etc., we prefer to feed one feed a day of soft food. Always have your water boiling that you mix the feed with. After the long fast of the night, the chick needs something that he will not be obliged to wait for the gastric juice to moisten, and the gizzard to grind, before he can feel the effect of it, and for the same reason some whole grain is good to feed at night for the organs to work on. Furnish the hen with plenty of whole corn while hovering the chicks so that she will not be too greedy and eat up all the dainties you may place before her for her chicks. Shallow dishes are best for the little fellows to drink from, and they should be often filled with fresh water. While caring for and feeding always keep in mind that all that goes to promote size, plumage, bone, sinew and muscle must go down the little fellows' throats. Keep them growing; much depends on their growth. At six weeks' old chicks of some of the varieties will be large enough for broilers, and if it is in March they will be worth, in any of the large cities, seventy-five cents apiece.

Young growing chicks need good ventilation. Impure air is destructive in more ways than one. They become lousy, scaly leg overtakes them, and they generally begin to droop and fall behind the flock. They huddle close together at night and the droppings soon become filthy and cause disease. To guard against it, keep everything clean. Feed in small V-shaped troughs, and never on the ground. Keep "Douglas" mixture in their drinking water, and never feed more than they will eat up clean. Give them a varied diet of anything they like, except raw corn meal dough.

You will readily see by what I have written that the poultry business is made up of little things, minute in themselves but large in the aggregate.

THE BUSINESS FARMER.

By J. H. HALE, South Glastonbury, Conn.

Figure the Expense.—I start with the supposition that every farmer has a farm either owned in his own right, partially mortgaged, or leased—in fact, an investment of capital on which dividends must be earned and paid, either in interest on investment, or borrowed capital, or in the payment of rent—before he can receive any compensation for his labor. The business farmer will, before beginning operations on his farm, do just as every other business man has to do, if he is to make a success of his business, carefully figure how much will be required annually to pay this, with cost of labor, taxes, wear and tear on implements, ordinary repairs, etc., and thus ascertain just how much the farm must produce in cash returns, before he can receive any compensation in the way of profits.

The Crops Best Produced.—Having found this, it becomes his duty to know just what can be produced, to the best advantage, on his particular farm, and what line of work best suits his tastes and circumstances; last but not least what markets are to be supplied, and how he is to reach them. In fact, these two last points should be settled before purchase or lease of the farm. However, if that question is already settled, he must put time and thought to the study of the situation.

Brain Work on the Farm.—Don't pitch into heavy, hard work with the idea that in this way you are to make a success of farming. The business farmer, whether his capital be one hundred, one thousand or ten thousand dollars, in every case, is not so much a worker with his hands as with his brain, studying and planning all his operations before putting them into practice. He has no more brain than the rest of us, but gets ahead by using his while we unthinkingly dig and delve day after day without method, grumbling that "farmin' don't pay," and that "ours is a hard lot." The fact is farming is the best and safest business of all. Were it not so, the slipshod, unsystematic methods many of us have followed in the past would have brought ruin long ago.

Habits of the Business Farmer.—The business farmer is a successful farmer, and always will be, if we are to judge the future by the past. He is a student, not of books alone, but of good agricultural papers; of experiment stations and their work; of the work of other farmers, successful and unsuccessful. He is also a close student of the markets for the purchase of his supplies as well as the sale of his products. He may not be a thorough book-keeper, yet he keeps an account with the various fields and crops; knows the cost of each product of the farm, and is as prompt to drop those that do not pay as he is to try something new, that his judgment tells him promises good returns. In fact he is a brain worker rather than a common field hand. He knows that so far as brute strength is concerned, he must take off his hat to the old horse or the little brown mule, and he gladly does it, and cooly rests his brain that he may better direct their work, and thus reap greater profits from the farm.

His leisure time in the winter is not spent at the village store, or in talking politics at the railroad station, or on the street corners, but at home planning for future work.

As soon as the year's operations close in the fall, he is making plans for the coming year. Long before spring opens he knows just what is to be planted on each field; where the seed, labor and manure is to come from. Every implement is in order, and enough extra repairs are ready at hand so that no time need be wasted during the hurrying days of seed time. The business farmer has learned that his farm is only a sort of manufactory, which, to be made profitable, must be run to produce that which the forges, looms and spindles of the soil are best adapted to; and that the finished product will depend almost wholly upon his starting operations promptly on time with a full supply of raw material in the shape of seeds, plant food and well-directed labor.

A Standard for Goods.—When the finished product is turned out, he knows that he must establish a standard for it in the market, and then maintain that standard, if he is to hold his customers and obtain satisfactory prices. One great trouble with us farmers is that we lack a standard for our goods. Ask any ten farmers to bring you a barrel of No. 1 apples or potatoes of a specified variety, and the chances are that you will get ten different grades of goods, the assorting having been made according to the judgment or honesty of each. Consequently "farmers' packings" in any line are almost always quoted at lowest rates in most markets, and it is often risky buying them at any price.

Packing Goods.—Farmers often get the credit of dishonest practices in packing and disposing of their goods, when no dishonesty was intended, the whole trouble coming from ignorance of business methods, and the requirements of the markets. It is the business of the farmer to know and understand this, and then conduct his affairs on a business basis. Reward will surely come. A business name and reputation is as valuable on the farm as in any other profession. I will cite a few cases in point:

Some time ago I was in a market town, and saw a car-load of apples unloaded, all in second-hand barrels, some round and some flat hoops. On the heads were stencilled the names of the former contents, "crackers, flour" etc. of a dozen different brands. On these were tacked plain, white cards with the name of the variety which each barrel contained, written with a pencil, and marked No. 1. A few were opened and found to be large, bright apples but had no uniformity in grading, and they sold at from $1.25 to $1.50 per barrel. Another car-load from a business farmer was in nice new barrels, on the heads of which were plainly stencilled the name of the grower, with postoffice address, the name of the variety, followed by the words, *warranted* extra No. 1, or No. 2. An examination showed no better fruit than the first lot, but instead of being all mixed up and marked No. 1, they were nicely graded, as indicated by the outside marks. The average price obtained for the whole car was $1.80 per barrel, or an average of 50c. more than the first named lot sold for, or more than twenty-five per cent. actual profit to the business farmer, who knew enough to pack his goods, guarantee them and put his name thereto.

Business Methods in Dairying.—A friend of mine who is producing milk for the wholesale market, from a herd of ordinary grade cows, takes the trouble to weigh the feed of each animal and the milk daily. By a careful study of this record he is able to know just how much grain ration he can afford to feed each cow; also just when an animal becomes unprofitable, and so dispose of her, replacing by one giving better returns. I might as well own up that his neighbors call him fussy, but the fact remains that while they are complaining that there is no profit in making milk at present prices, he has a pleasant, happy home, with all the comforts and many of the luxuries of life, is yearly adding to his bank account, and the old farm is improved in productive capacity, for he is a business man, devoting, as he does, the best thought to his special line of work, and not unthinkingly drifting along, and then grumbling that there are no profits to be obtained in agricultural pursuits.

In Fruit Raising.—On South Water Street, Chicago, some years ago, I saw red raspberries selling for twelve cents per quart, from a number of different growers from Southern Illinois. One lot, carefully branded on the outside, the dealer asked sixteen cents for, and refused to open. "That name," said he, pointing to the stencil mark, "is a guarantee that they are all right. He is a thorough business man. We and our customers know they will prove to be just as represented."

Following up this lead, I visited the grower at the farm, and found, as I expected, a business farmer. He had learned that for firm fruit his berries must have sunlight and air while growing; hence they were not planted as thickly as was the custom of his neighbors. He had also learned that certain kinds of plant food effected the texture and quality of the fruit, and by a lot of plat experiments learned what to use and what not to use, to give him bright colored and solid fruit; also that if the fruit was cooled at once when it came from the vines, it would keep and ship much better than if not so handled. These and other questions he had studied out as a matter of business. All this had cost him time, money and labor

Doubtless his neighbors though he had better be at work instead of fussing so much, but he was a business farmer and knew he must thoroughly understand his business, if he was to make a success of it, and the twenty-five per cent. extra price obtained for his fruit was not good luck, but payment for value received in a higher standard of quality obtained by business methods.

In Grain Raising.—Farmer take-it-easy thinks "there ain't much money in wheat when you can get only about twelve or fifteen bushels per acre, or in corn at thirty to forty bushels per acre." The business farmer knows he must get more than that or be bankrupt in time. He will tell you just what it costs to produce a bushel of corn or wheat, and show that we must increase the yield or lower the cost of cultivation per acre; and as the latter cannot well be done, the one and only thing to do is to produce more, by a more thorough preparation of the soil for planting, and still better care for the growing crop. If it is possible and profitable to produce thirty-five to forty bushels of wheat per acre, and seventy-five to one hundred bushels of shelled corn, we should do so, and the business farmer, who is producing this class of farm crops, sets about doing it—first by cutting down the number of acres cultivated to the number he can thoroughly attend to, and then aiming to obtain the greatest results, or know the reason why.

In Animal Husbandry.—Beef, mutton and pork are staple crops on many farms, yet how many of us know what it costs us per pound to produce, and if, on the whole, a profit is made in the business, whether the profit comes from the young growing animal, or from fattening the more matured one? On this point the late Hiram Sibley, of Rochester, N. Y., a gentleman who made a fortune at farming long before he went into other branches of business, in the course of a long chat on the train, told me that living in the dairy districts of New York he found the farmers so anxious for the milk product that all calves were sold or killed as soon as born, and that instead of growing their own cows they were continually buying new ones at high prices. Being a business farmer, he converted his whole dairy into a nursery for the raising of young calves, and brought them up by the hundreds. When a few months old, and a car-load was ready, they were shipped to his farm in Illinois, where feed was cheap, and were then fed and cared for in the best possible manner, to keep them growing all the time. When full grown, they were promptly disposed of to make room for other younger and growing animals, for, said Mr. Sibley, I had learned, after several years' careful test, that the only money to be made on an animal was in growing it. Not a dollar was ever made in fattening. Mr. Sibley has been called a fortunate man, but I am satisfied that had he not been a business farmer, and known from the start what was and what was not profitable, he could never have made the success in life that he did.

Do Business for Cash.—The business farmer does business on a cash basis, well knowing that he cannot afford to do otherwise. If he has capital of his own, so much the better, but be he rich or poor he always has cash on hand for the purchase of such supplies as are required for the proper conducting of his business, and also to be ready to take advantage of any good trade which may develop in the direct line of his work. The poor man who is a business farmer knows that the buying of implements, supplies, etc., on credit, means buying at the very last moment before being ready to use them, and thus being obliged to buy such as can be had in the nearest market, and paying the highest retail price for them, which, on most farm implements, and many household supplies, is from thirty to fifty per cent. advance on manufacturers' prices. He is therefore as liberal a borrower of money as his credit will allow, and the legitimate requirements of his farm and home demand, just as is the enterprising merchant or manufacturer. He is thus able to watch the markets, and, knowing his future wants, has ample time to correspond with headquarters and obtain lowest quotations; and then, by buying out of season, get "bed-rock" prices every time, saving enough to pay the interest on his borrowed capital many times over.

A Case in Point.— Just one case in point: A business farmer, a friend of mine, who knows that it is to his advantage to subscribe for and read ten or more of our agricultural papers, learned last December that fine ground bone, potash, nitrate of soda, and other chemical manures, that he required for use on his farm in the spring, could be bought at very low rates; therefore, making out a list of just what he wanted, he wrote to six or eight importers and manufacturers, asking quotations on forty tons of goods for immediate delivery and for "spot cash," although at the time he had not the money to pay for two tons. All the dealers were glad to bid low for so large a cash order, four months before the usual time of making their sales. Consequently, he was offered No. 1. goods at extremely low rates, and accepted one of the bids, borrowed fourteen hundred dollars, and, when bill of lading was received, paid down the cash.

The fertilizers were carted at a season when his teams had little else to do, and thus quite a saving was made.

Four months later, when ready to use the goods, his neighbors, who do not practice business methods, were paying an average of nine dollars more per ton for the same goods, and as twenty-eight dollars paid the interest on his borrowed money capital, he made a net cash saving on that one trade of three hundred and thirty-two dollars—quite a little sum of money to be made out of one transaction, and yet honestly made by applying business methods to the purchase of farm supplies.

No Use for Agents.—The business farmer has no use for agents or surplus middle-men. He is not induced to buy every new thing that turns up, and pay a fancy price for it, but is his own agent, does his own thinking, and when, in his judgment for the better conduct of his farm or household operations, he counts the cost and estimates whether it will be profitable for him to invest or not, before he purchases.

Brains Are at a Premium.—In fact he is a man who minds his own business rather than to pay some one else for doing it for him. He is not averse to picking up all the information he can by association with others. He is therefore a worker and student in the local farmer's club or grange, is never so busy but that he can find time to attend institutes, Pomona granges, agricultural and horticultural meetings of all kinds that are within reasonable distance of his home. He knows that brains are at a premium on the farm, and while continually polishing his own by contact with others, his boys and girls are given the best possible education in the home schools, after which he will send them to the State University for a full course of scientific training, if he is able, and if not (if a resident of Wisconsin), he will see that the boys take advantage of the short term course that is offered by the University at Madison. Not only the business, but every other farmer having boys, should eagerly accept this grand opening which has been made whereby his boys, even though required to be busy at home through the summer, need not be deprived of a classical and scientific education. There should be three or four hundred such students at Madison every winter, from the farm homes of this State. Keep this up year after year, and the intelligent, successful business farmer will be the rule, and not the exception; farmers will take their proper position in society, and before the world, every farmer will be a business farmer, receive a just compensation for his labors, or know the reason why.

HOW TO FEED A FARMER.

By J. RHODES, Kansasville, Wis.

The Best Brain Food.—Observation has developed the fact that the best brain food is that which keeps the body in the best and healthest condition. Body and mind are so linked together that an injury to one is usually a damage to the other, and a benefit to one an advantage to the other.

The Process of Digestion—Is analogous to combustion. Its chemical changes generate heat from the food we consume, and supply warmth to the body. This heat is so wonderfully regulated as to remain about the same summer and winter, although the climactic temperature varied here last year about 130 degrees. There are some things about the generation of animal heat which are still a mystery, and must be left to the best talent of the land to explain. It seems, however, that digestion in some way eliminates carbon from the food we eat, and this carbon is carried by the blood to the lungs and here meets the oxygen of the air we breath. They unite to form carbonic acid. The union of the two elements generate heat just as is done in the chemical process called fire.

It is evident, then, that we do not need large quantities of carbonaceous food during the heat of summer. Therefore the farmer's wife who puts fat pork, fried cakes, and corn-bread on the table, with the thomometer at 102° in the shade, violates a law of nature, and the stomach, the liver, and the hired man promptly rise up in rebellion. If the great Napoleon lost a battle through eating a bad dinner, how much are some of our Wisconsin farmers losing annually through a succession of poor meals—losing physical vigor, and mental activity.

Providing Food.—The husband who provides nothing but a dish-cloth for his wife to cook a meal from must not expect a royal feast, and if there is a man on the face of the earth who has the means to provide for his wife healthful, nutritious food for culinary purposes, it is the Wisconsin farmer. For meat he has poultry, mutton, veal, beef and pork—all of which can be kept fresh during the winter months, and much of it can be cured so as to be quite palatable during the coolest weather of summer. It is certainly poor economy for farmers to sell meat to butchers at five and six cents per pound, and then buy it from the grocer the next summer at 15 to 20 cents per pound. Farmers must learn to cure their own meat.

Food From the Garden.—But the best, most bountiful, healthful and varied supply of food for the farmer's table should come from the garden. In vegetables, the variety is legion and suited to all tastes. The crisp, rich and juicy samples growing in the farmer's garden one hour and gracing his table the next bear no resemblance to the wilted, half decayed truck which city people have to eat.

Small Fruits.—Next, look at the list of small fruits within our reach. Beginning with strawberries, they furnish a continuous banquet from June to November, and include cherries, currants, gooseberries, raspberries, blackberries and grapes. Without invading women's realm, by telling how to cook them, all of these could be eaten, when fully ripe, with sugar and cream. Being consumed at home they can remain on bush and vine to distil from earth, air and sunshine, ambrosial nectar which would almost tempt St. Peter back to earth. The hard, sour, and immature fruits which are picked to ship, no more resemble those properly ripened than raw potatoes resemble Saratoga chips.

Feed the Mind.—In distributing the good things of earth to the millions of all nations, let the farmer not forget the family under his special care, and who are depending on him for physical growth. Above all let him feed their minds for the life struggle which lies before them, teaching them their responsibilities as future heads of the families and members of that great thinking, conservative body of farmers who must in the future even more than the past be the mainstay of the nation, upholding society and government against the selfish, brutal and chaotic schemes of the ignorant, irresponsible, floating population of our large cities.

CLOVER FOR FERTILITY AND FEED.

By CHAS. V. GUY, River Falls, Wis.

Barnyard Manure the Best.—In the St. Croix Valley there are found all varieties of soil, from sand to clay, mixed often with vegetable mold, forming either a sandy or clayey loam. Each is adapted to the growing of a different class of crops, and each requires special treatment to increase or support its fertility. As barnyard manure contains in due proportions the essential elements of plant food, it is applicable alike to al soils—finely rotted as against green coarse, strawy manure, for dry, sandy land, while the reverse is suitable for clayey soils.

Plowing Under Green Crops.—The ordinary farmer finds, with all his care and pains-taking, the supply of manure, as obtained from the consumption of home-grown crops, quite too small to adequately fertilize his fields, and his only resort is commercial fertilizers, or plowing under green crops. The former, except gypsum and salt, are quite too expensive to repay the cost of $25 to $60 per ton in any field crop at present market prices. This leaves clover practically as our only remaining source of supply. How shall we apply it? is a serious question. The readiest answer is, feed it to stock and get a return in animal growth, and from two-thirds to three-fourths of its value in manure. But this requires more capital and labor, brains and energy, than the average farmer can command. Then let the earth act as consumer and feed the whole crop at once by turning it under with the plow. The results will be in proportion to the growth of the crop plowed under.

If the year's growth is too expensive, a crop can be taken off at the first blossom and left until the second growth is in bloom in the following August, when this may be plowed under. A large part of the value of the crop for fertilizing is in the root. This treatment leaves the ground in most excellent condition for any kind of crop. Land plaster has a very beneficial effect on the growth of clover on rather sandy or clayey land. An application of from one hundred to one hundred and fifty pounds per acre will increase the crop fifty to one hundred per cent., and its effects are quite noticeable for two or three years after sowing It is not claimed that there is great manurial value in gypsum, but it is claimed, by the highest chemical authority, that it acts directly in fixing the ammonia, which is an essential plant food, in the soil just where the plants can use it; while without the chemical influence of the plaster the ammonia would be evaporated by heat and lost to the soil.

A Valuable Experiment.—An experiment is reported where a quantity of clover plants was taken from the earth in May, about a year after planting, the earth being removed by a stream of water. The roots were set in sand, or crushed rock, from which all plant food had been carefully removed, watered with distilled water for some two months, until the blossoms of the plants matured, and then analyzed. It was found that the organic elements had increased nearly three times and the ammonia nearly doubled. This result was obtained from the air and water alone. The experiment goes to prove that clover will grow on our poorest sandy soils in a wet season and, by a system based on the result of this experiment, our poorest lands may be profitably cultivated.

Sowing Clover Seed.—It is claimed that a pound of clover seed contains nearly two hundred and sixty thousand grains. This estimate, I think, by an actual count of a weighed quantity, is very low. Twenty per cent. may be safely added to it. One pound, about a pint, gives, on this basis, six or more plants per square foot, if evenly distributed. This is quite as much as the land ordinarily shows one year after seeding. The practice of most farmers is to sow from four to eight quarts per acre, mixed with small grain at the time of spring seeding. Clover seed covered over one inch, it is said, will not germinate. If this is so, a great loss is sustained by too deep covering of all seed sown by mixing grass seed with small grain, and sowing with the ordinary drill or seeder.

Cutting and Curing—Of cuttin and curing clover for winter food there are almost as many methods as farmers. If the weather is favorable the process is very simple. Cut when dry of dew or rain, let it wilt, turn with a tedder and haul the same day; put in a tight bay or silo, keep covered from air and, though much discolored, its nutritive properties are well preserved. Clover free from external moisture will keep in a tight barn, if put in very green. A peck of salt to a ton of dry hay will tend to prevent dust, and makes it palatable to all kinds of stock. From a single year's experience with clover ensilage, I should not recommend building a silo for green clover.

Feeding.—Contrary to general opinion, I have found clover hay the best coarse food I have ever fed. I have fed it to all kinds of stock, and prefer it to any other hay for horses, except for driving horses, it being to relaxing for quick driving. But for the work on the farm, or even heavy hauling, it has been intirely satisfactory. A patch of clover for growing hogs provides a very cheap and nutritious food; but of dry clover hay, they will not eat enough to perceptibly effect their growth. For a pasture for all kinds of stock, it is of little value. Being a biennial, it makes its seed the second year and ordinarily dies out. Other grasses must be provided to take its place, and it is best to plant them at the first seeding. Where clover winter-killed the winter after sowing, in two cases, I have dragged the ground and re-seeded in early spring with excellent results.

Clover hay, fed with corn ensilage and a small ration of wheat bran, has produced with me excellent results, as a food for dairy cows. In one instance I fed clover hay with dry oats to a horse badly affected with the heaves, and never had him do so well on any other feed.

The Best Forage Plant.—In my experience, next to corn, I have found clover the best of all our forage plants. Its deep running roots obtain their food from a lower stratum of soil than most other plants, and it will remain green and vigorous when many of the grasses, and nearly all root crops, are more or less injured by drouth. It derives a large proportion of its nitrogen from the air, and thus draws but lightly from the fertility of the soil. On our alluvial lands, it is quite practical, by a system of rotation with corn or potatoes, a crop of small grain and one of clover, the aftermath being turned under, with one dressing of land plaster, at a cost of 40 cts. or less per acre, to raise a paying crop for an indefinite number of years, and not exhaust the soil. This can be done with no other plant with which I am acquainted.

MONEY IN SMALL FRUITS.

By J. H. HALE, South Glastonbury, Conn.

The Value of Money.—My subject has a very pleasing sound, for who of us, tillers of the soil, does not jump at the chance of any honest industry that there is "money in?" Not that the gathering or accumulating of money is, or should be, the chief end of life, yet we all know and appreciate its value in securing for us the comforts and necessities of life, and should neglect no honorable opportunity to obtain enough of this world's goods, that our families may not be denied these things.

An Infant Industry.—The subject, "Money in Small Fruits," would indicate that the planting and cultivating of these choice gifts of nature were to be carried on for the sale of the products, and to this part of the question we will now turn our attention. Of course you will understand that the term "small fruits" applies to strawberries, raspberries, blackberries, currants, gooseberries, etc., and not to small or second-class apples, pears, plums, etc. It may well be called one of our infant industries, for it is within the memory of most of the middle-aged men here, that the first berries were offered for sale in any of our markets. The principal development of the business has all been within the past twenty years, and it is really only within the past ten years that all the small towns and villages of the country have begun to have anything like a fair supply, while there are yet hundreds of towns and villages that are not one-half supplied, and those that appear to be well furnished now would use many more if better fruit were offered and in a more attractive style. So there is a chance yet for new beginners, if they are willing to live up to the requirements and demands of the times. However, before attempting the business it is well to know that not all cultivators of berries have found money in small fruits. In fact there have been some very serious failures.

Requirements for Success.—The requisites for success are:

1. A love of fruits for their own sake; a pleasure in their culture.
2. A soil fairly well adapted to them.
3. Good local markets, or convenient access to railway lines which center in market towns.
4. Extra laborers, near enough at hand to be called on, in case of emergency, in cultivating and gathering the fruits promptly and economically when ripe.

Having made sure of these things, if one is starting in business, care should be taken not to plan for planting more than can be cared for in the most thorough manner, or sold to good advantage.

Strawberries.—Of the various fruits, strawberries will receive first attention, as it is from them that the quickest returns may be expected. Any good corn or wheat land will produce fine strawberries, but to secure the best results, it must be very rich in natural fertility, or made so by the application of manure in some form. My own experience has been that any soil rich in organic matter, or fertilized with stable manure or commercial fertilizers rich in nitrogenous matter produces too much foliage growth for the most profitable returns in fruit; and my best crops have come from a sandy or loamy soil, where commercial fertilizers had been used containing a large percentage of phosphoric acid and potash, but lacking in nitrogen.

However, as the use of commercial fertilizers does not, as yet, enter largely into the question of culture in this section of the country, it may not be well for me to say much on this subject.

Preparing the Ground.—Land that has been in cultivation for a year or two previous is best. Plow this as deeply as possible early in the spring; then harrow it over and over again until a perfect seed-bed is formed. An extra day or two spent by a man and team in a thorough preparation of the land, will usually show itself in ease of cultivation later in the season.

Setting the Plants.—When the ground is thoroughly prepared, with a corn-marker, check off rows three feet apart, and set the plants from twelve to twenty inches apart in the row, according to the vigor of the variety. If pistillate or imperfect flowering varieties are used, plant every third row with some strong, perfect flowering variety that blooms at the same time. Too many make the mistake of planting a greater number of rows of pistillates before adding the perfect bloomers to fertilize them, and also make the selection of varieties without regard to the time of blossoming.

Cultivating.—Cut off all blossoms or fruit stalks as fast as they appear, and as soon as growth is well started, begin the summer cultivation, which should be kept up once in two or three weeks all through the season, until weed growth is stopped by freezing in the fall. On my own plantations the last hoeing is usually done in October.

The Narrow Row System.—Having been growing berries for market for twenty-five years and testing the various systems of hills, narrow rows and matted rows, as well as studying results obtained by these methods in all the Northern States, I am satisfied that the narrow row system is on the whole the most profitable. By this method, each of the spring set plants is allowed to root a few of its first runners, along near the line of the row, after which all the runners are cut off as fast as they appear. The advantages of this plan are that more of the work of cultivation can be done by horse-power, as in hill culture, and yet there are always young plants enough to form one continuous row, even if a few do get destroyed in any way. There is abundant room for sun-light and air to reach all the berries when ripening, which assures larger, better colored and higher flavored berries than can be grown in matted rows; also firmer fruit that stands transportation much better, and sells for higher prices.

There is another advantage in this plan. It costs but little to clean out a bed of this sort after fruiting, and so renew it for another season's crop at little expense, while in matted row culture it is seldom profitable to continue a bed in fruiting more than one year.

Mulching.—When the ground is frozen in the fall, cover the whole field lightly with a mulch of old hay, straw cornstalks, or any coarse material that will protect the plants against the alternate freezing and thawing of late winter and early spring. This need not be removed, but when growing time approaches pass along the rows and partially uncover the crowns of the plants, that the new growth may push up through it. Thus the mulch can remain to keep the ground moist, and the fruit clean during ripening season.

Importance of Moisture.—This question of moisture at ripening time is a most important one. Many a field of strawberries that has received fairly good care during the whole year, has failed to produce profitable results, simply for the want of sufficient moisture, just at the fruiting season. Therefore, where it is possible, without too great cost, irrigation should be provided, if the highest results are to be obtained. Where the markets are large enough to readily handle, year after year, the product of five or more acres from one farm, I am satisfied that an investment of from one to two thousand dollars for irrigation purposes would pay handsomely. However, as such an amount of capital cannot well be so invested by many planters, and cheaper means of obtaining an abundant supply of water are not to be had except in rare cases, therefore, I urge a thorough preparation of the soil for planting, and frequent cultivation that the plants may root deeply and thus be able to withstand drouth, which comes so often just when we least expect it.

Gathering and Marketing.— In gathering and marketing the crop there should be one picker for each thirty or forty quarts of the daily product, and a superintendent to every fifteen or twenty pickers, to assign them their rows and inspect their work from time to time; to see that they keep to their rows and do not trample on the vines. Pick the fruit clean and grade it according to the demands of the market to be supplied. Upon the thoroughness of this superintendent's work will depend, in a large measure, the success of the business.

Picking, except for local markets, should not begin till the dew is off in the morning, and should not be continued through the heat of the day. If pickers enough can be had to rapidly gather the crop, from four o'clock till dark is much the best time.

Packing.—The packing shed should be a cool, airy place, convenient to the field, and here all the fruit should be brought as fast as gathered. A general inspection of the fruit should be given by the person in charge, and it should be packed according to its grade, each variety by itself. Baskets or boxes should be new and clean, and made of the whitest wood that it is possible to obtain. All should be as rounding full as can be conveniently packed without injury to the fruit. There should be no inferior fruit put in, and that in the bottom and middle of the package should be just as good, or better, than that on top. Having made sure of this, these should be carefully packed in clean, bright crates or boxes of the size required by the markets where the fruit is to be sold. It is usually good policy to conform to the customs of the markets whose trade we seek. However, where we find those that have not attained a high standard, it may be well to humor them to the extent of sending second-class fruit in the old style, and market our best in the most approved packages obtainable. It will attract attention to our goods, and win favor and custom, especially if we guarantee every package to be as represented. We can not afford to spend eleven months in careful cultivation of our fruits, and then accept inferior prices, simply for the want of a little care in the details of marketing.

Raspberries—Red, black and yellow, following strawberries as they do, should next receive the attention of one who is after the "money in small fruits." These require much the same soil as strawberries, except that they may be grown with profit on land that is far richer in nitrogeneous matter.

Planting.—Fall is the best time to plant all but the cap varieties. The ground should be as thoroughly prepared as for strawberries. For years I have planted in rows, six, seven or eight feet apart, according to the vigor of the variety, placing the plants two and one-half to three feet apart in the row; but I am now satisfied that larger, finer and better berries can be grown by planting in check-rows five or six feet apart, giving the plants more sunlight and air and admitting of more use of the horse and cultivator, thus securing better culture at less cost, while the yield of fruit is fully as large as from the hedge-rows.

Cultivation.—Cultivation should begin early in the season, and be frequent and thorough through the summer months, so as to stimulate a rapid growth early in the season, giving ample time for maturity of wood during the fall.

The new growth should be pinched back when fifteen to eighteen inches high. This will cause a strong growth of lateral branches, which should be allowed to grow at will, leaving all further trimming till early the following spring.

Winter Protection.—Few, if any, of the best varieties are hardy enough to endure the winters of Wisconsin without some protection, if you are to make sure of a crop annually. It is therefore best to lay them down and cover with earth at the approach of winter. This can be done at a cost of from five to eight dollars per acre, and is a cheap method of insuring a crop, so far as the extreme frost might affect it. As soon as frost is out, and ground is dry enough in the spring, uncover and straighten up the plants; thin out and shorten in the laterals from eight to fifteen inches, as may be required to form a well-balanced bush.

Thorough cultivation may be given up to blooming time, after which it is not well to stir the soil till after fruiting.

Gathering and Marketing.—The gathering and marketing should be on the same general plan as for the strawberries, except that pint boxes or baskets should be used in place of quarts for the most delicate varieties.

Blackberries—Should next receive attention, and as they are generally inclined to make too much wood growth, it is well to select land of moderate fertility.

The high bush varieties may be planted either in spring or fall, the latter being the best; planting the same as the strongest growing raspberries, while the dewberries or trailing blackberries should be planted in the spring in rows ten feet apart, plants three to four feet in the row, and allowed to form a matted bed.

Close pruning and winter protection are essential to the highest success in blackberry culture, as with raspberries.

Gooseberries—Currants.—There is only a limited sale for gooseberries, but for currants the demand is still far greater than the supply.

Soil—Cultivation. —Strong, rich, fairly moist soil is best for the latter; they may be planted at any time after their leaves drop in the fall, or very early in the spring, in check-rows, four and one-half to five feet apart. The growth is all made the first two months of summer. It is therefore essential that the cultivation be thorough and liberal early in the season, if we wish to stimulate the best wood growth.

Pruning.—The first two years only enough pruning will be required to form a broad open-headed bush, with bearing wood evenly distributed; but in later years a pinching back of all the new growth when two or three inches long will tend to develop a wonderous formation of fruit spurs and buds.

General Principles.—In a general way I have now outlined some of the main features of small fruit culture, and now lay down a few general principles that must be lived up to if you are to find the "money in small fruits."

FIRST.—Thorough culture.

SECOND.—The best possible shipping packages.

THIRD.—Honest packing of fruit from top to bottom, yet making as fine an appearance as possible.

Varieties a Local Matter.—As to the question of varieties, that is a local issue which it is best to study out for yourself. Study the markets that you are to supply, then visit growers in your county and State, learn from them what are the well-tested and approved varieties, and make the largest share of your plantings of these.

The world is improving all the time, and so are our small fruits; yet don't rush head-long into highly-praised new varieties. Test them all in a small way, and you will surely find some that are just suited to your soil and market, thus obtaining for yourself an advantage not possessed by others.

Net Profits.—With culture such as I recommend, strawberries should yield four thousand quarts per acre, should sell in your markets at about eight cents per quart — a net profit of one hundred and fifty dollars per acre.

Raspberries should yield about three thousand quarts per acre, which, at ten cents per quart, will net about the same profit as the strawberries.

Blackberries should give rather more quarts than raspberries, but selling for less price the profit is not quite as great.

A good product of currants is from fifteen hundred to two thousand quarts per acre, and the price I suppose here is about six or eight cents; but as a field of currants may be kept in fruiting for an indefinite number of years, it is one of the most profitable of all the small fruits, as the cost of culture is so much less than any of the others. Strawberries have to be renewed every two or three years, raspberries and blackberries every five or six, for the best results.

The Family Small Fruit Garden. — To get at bottom facts as to "money in small fruits," the family garden is the place to begin and end, if we are looking for greatest results. Every farmer should, and will have, when he awakens to a full sense of the duty he owes to his wife and loved ones, a family small fruit garden of a half acre or more, in proportion to the size of his family, and his real interest in their welfare, for right here he has a home market that will take at high prices every day in the week, quarts upon quarts of the choicest product of his plants.

Fruit as Diet.—The importance of fruit as an article of diet is at last beginning to be appreciated, and the sooner we all understand that every dollar expended on the fruit garden will save at least two dollars in butchers' and doctors' bills, the better. Three times a day the whole year round our tables could and should be supplied with these refreshing and health-giving fruits of our own growing. How much better for the boys and girls at school to have a dish of fresh berries, a cluster of grapes, or a cup of raspberry jam, and good nutritious bread and butter for their dinner than to have the mother slave herself to death from day to day in preparation of some health-destroying compound of grease and spices in the shape of loaf-cake, doughnuts, or mince pie, to tempt the appetite and destroy the stomach, as well as a lot of good flour, eggs and butter that might be used to give health and strength rather than destroy it. I note with pleasure, in my travels, that fruit-growers and such farmers as have plenty of fruit, very seldom have pastry of any kind on their tables, its place being supplied by fruit, either fresh or canned; and since the improved methods of canning that have been adopted in the past few years, it is possible to have fruit at any season of the year, approaching in flavor that fresh from the vines, red raspberries retaining their flavor the best of all.

The taste for fresh fruit is growing fast, and while many of our farmers know that they ought to supply it to their families, they still fight shy of planting, and say they can buy what berries they want cheaper than they can grow them; yet they will not buy one-hundredth part of what their families would use if it could be had for the picking. My own family is not a large one, yet we manage to dispose of from six to ten quarts of strawberries, raspberries, currants, and blackberries, per day through June, July, and August, and the next three months we worry along on peaches, pears, and the product of 116 grape vines.

A friend of mine having a half acre city lot, bought his fertilizers, hired the land plowed, and planted thereon, twenty-six dollars worth of plants, kept an account of all money paid out for labor for five years, and charged the family, at market rates, for all fruit consumed. He told me that this half acre paid him a profit of one hundred and sixty dollars annually. Such a half acre should be on every farm. Your wife and other loved ones will appreciate it, and you shall see that there is health and happiness as well as money in small fruits.

BREEDING AND FEEDING SHORTHORNS.

By P. WAKEM, Manager of W. H. Jacobs' Premium Herd of Shorthorns, Madison, Wis.

Selection of Cows.—I would advise you, in making your selection of cows, to establish the foundation for a herd of Shorthorn cattle, to first make up your mind as to the kind of an animal you want; to inform yourself somewhat on pedigree; then go to what you consider an honest and reliable breeder. Herds of Shorthorns are so numerous that you should have very little trouble in finding one containing such animals as you would desire to buy. Then, if you wish to select a cow for beef principally, I would select a low-down, short-legged animal, a good mellow handler. Never mind what color, whether red, white or roan. If you wish a good milking cow, you would, of course, be sure to go to a herd that had been handled with a view to the development of the milking qualities. A great deal depends on the management of a herd as to whether they are good milkers or not. I think a man can develop that quality in the Shorthorn cow to a wonderful extent, by paying proper attention to the feeding and milking.

About Pedigree.—I would advise you not to be too particular about getting a so-called fashionable pedigree. Some one who, perhaps, does not know half as much about cattle as you do may say that they have an out or unfashionable cross in them, tracing back to the importation of 1817, over 70 years ago. You would naturally think it bred out before now, even if their breeding were not kept track of prior to that date, as it should have been. Nor would I advise you to look too much to individual merit, as sometimes you will get a very good animal of great individual merit which will still be a very unsatisfactory breeder. For myself I would much rather have an animal with a good long pedigree, known to have come from a family of good milkers and great beef producers than one of extraordinary individual merit which I do not know came from a long line of great ancestors.

Be careful to buy cows standing squarely on their legs, wide between the fore legs, thick through the heart, with good crops, strong loins, broad hips — good mellow handlers. Observe these points, and, my word for it, you will have cows that will take on flesh rapidly, and prove good breeders, if judiciously bred.

The Head of the Herd.—After having bought the number of cows you wish to start with, select and buy a sire to head your herd. A great deal now depends on the kind and quality of cows you have bought. If they stand a little too high on their legs, be sure and buy a sire that is short on his legs. If they are not very good in fore quarters, get a sire that is well developed in front. If your cows are a little defective in hind quarters, be sure and get a sire that is well developed in this respect. Do not fail to get one with a good masculine head, as he will surely make the most impressive breeder. Did you ever notice, in your feeding lot, a steer with a long, fine head and really premium in looks? If so, was he a good feeder? Never.

You must get the short, thick head, with good strong jaws with the ability to crush an ear of corn, to be a good feeder; and you can never get such unless your sire has a good, strong masculine head on him. Be careful to get an animal with a good loose hide—a mellow handler—as that will tell you whether he is a good feeder or not.

Never forget in purchasing that your bull is half your herd, if not more, as every calf you raise from him, if an impressive breeder, will, in all probability, take more after him than the dam. Do not buy some overfed brute that has been kept in the stable and pampered from birth, but one that has been well fed and exercised. Do not be too particular about his color. You might, with good grace, be a little particular about your sire's pedigree, as it is much easier to breed on a good cross than breed out a bad one.

Proper Age to Breed Cows.—The proper age to breed your cows is at or about 24 months old, never allowing but one service. Then the cow should be tied up, or put in a box stall, and kept by herself for at least twelve hours after breeding. If cows are in good flesh and on grass, I would give no rations or grain until, perhaps, two months before calving, when I would feed a small ration of ground oats and wheat bran. Ten days before calving I would give a little oat meal, and, if in winter, I would add a little corn meal and roots, with hay, always being careful to allow plenty of exercise. After calving, I would feed very carefully, being particular to keep udder well milked out; after ten days I would increase her feed, always feeding plenty of roots in winter, as there is nothing our cows seem so anxious to get as their feed of Swede turnips once a day.

A cow, if in good flesh and health, will usually come in heat four or five weeks after calving, when, if I were in shape to take care of her at calving time, I would breed her again. We like our calves to come in the fall, as we can take better care of our cows and calves in the winter than in the summer, and as it makes the bull calves about fifteen months old in a year from the next spring, when they meet with ready sales.

Care of the Calf.—The calf should be allowed to suck as often as it wishes, for the first ten days, and kept away from the cow after that, except to allow it to suck three times a day, at regular intervals of time. I would let it suck three times a day until three months old, when I would allow it with the cow only twice a day, and at the age of six months would wean it. Always have plenty of water where the calf can get to it, as it is very fond of a little water, especially after sucking. When your calf is about four weeks old, you should place a box with some ground corn and oats, a little wheat bran and some sliced roots, where he can get to it; he soon learns to eat it. If in winter, you should keep hay where he can get to it all the time. After they are three months old, I never have seen calves do better than they will on shelled corn and oats, wheat bran and sliced roots, always feeding two-thirds oats and one-third corn.

There is nothing more essential in successful feeding than regularity. If Shorthorn calves are fed regularly, and as I have described, you will have no trouble in putting one hundred pounds a month on them. After they arrive at the age of 12 months, I believe all grain rations should be ground and fed. In summer I do not believe in feeding much grain. Calves should, of course be fed, as they must be kept growing from birth, and never allowed to lose their calf fat. Taking the whole year, I would, perhaps, feed stronger than some men, as I thoroughly believe there have been hundreds of Shorthorn cattle spoiled by not feeding enough to every one that has been hurt by feeding too much.

Shorthorns as Improvers.—The Shorthorn sire as an improver of all other beef breeds, as well as the native or scrub, has no equal. Some of the other beef breeds make a remarkably good first cross, but afterwards the improvement is less marked than in the Shorthorn. Take a Hereford sire and cross on the native or scrub cow, and your first produce will, most likely, be a white-faced calf. Then take the cow calf and, when at the proper age, breed her to a pure bred Hereford, and the produce is more likely to be a speckled or roan that it is to have a white face. For several years of my life I was connected with a ranchman who was the owner of ten thousand cattle, and I thoroughly believe one of the best informed men on breeding I have ever met —a man who had experimented and carefully studied, and amassed a fortune of nearly one million dollars and has it yet. He tried nearly all the beef breeds and finally discarded all but the Shorthorn. I have known him to take bulls worth to sell four hundred dollars each and turn them out on the ranch to breed his cows to, but he was careful to take them up when breeding season was over and feed and care for them until time to turn out again. He always claimed that where his cattle were located (Wyoming), they were better rustlers and made more improvement than any other breed, not only in the first cross but in each cross afterwards.

As Mothers.—The Shorthorn cow makes one of the finest of mothers, always ready to protect her calf, although so mild and apparently intelligent when properly handled. I have heard that there are Shorthorn cows that will not give milk enough to raise their own calves, but in an experience of over twenty years I have never seen one of that kind. We have at present a pure bred cow only 3 years old, and weighing over 1900 cwt., and has had her second calf, that is giving twenty quarts of milk a day. She is not fed high, or in a way to make her give much milk. She was one of our show heifers for two years. In fact, I have seen hundreds of Shorthorn cows, and pure bred ones, too, that would give two 12-quart pailfuls a day when in full flow of milk. If a farmer can raise that kind of a cow, one that is a good milker, and when he is through breeding her he can turn her off for beef, at a great weight, what more does he want? I think he should feel satisfied with her.

Why Use Scrub Sires?—Does it not seem strange that there are not more pure bred sires used? They are certainly cheap and plentiful enough. It is either ignorance or indifference that makes men use a scrub sire of any kind or breed of stock. They will not pay the small amount asked by the publishers of agricultural and live stock papers to read and inform themselves, and have no ambition to learn, believing in their own narrow minds that they know it all now. So they continue in the old ruts. Scrubs are good enough for them; they are scrub men.

Buy Some Good Cattle.—A short time ago we concluded to have more stock to eat up our surplus feed, rather than sell it off the farm, as we need all the manure we can get. Not knowing where we could get three or four carloads of high-grade steers in Wisconsin, we concluded to go to Chicago. We went into the Exchange building, to the office of our commission man, and made our wants known. "Well," he said, "of course you want well bred ones? You will see very few coming from Wisconsin." It was really surprising to see the small number of good cattle there were among the twelve thousand on sale that day. Any farmer who will go to Chicago and see the difference in price between well bred steers and scrubs or natives and not go home and sell the scrubs and buy some good cattle, does not deserve to ever be able to own any. I would like to know what better investment any farmer can make than to buy a Shorthorn cow or two, give a growing up son, and then advise with him as to the proper manner of breeding for improvement. Buy books to read about pure bred stock; take all the agricultural and live stock papers within reach, for him to read. How much better he would be employed than in reading a novel, or hanging around the village store. and how much better you would feel to see the mind of your boy trained in that direction.

UNIVERSITY OF WISCONSIN.

ADVANCES OF THE PAST TWO YEARS.

In our first BULLETIN attention was directed to the fact that the University of Wisconsin had grown faster than the people's knowledge of it, and that a true university of the higher order was developing in our midst more rapidly than had been realized. The growth of the past year has given added truth to this since it has been exceptional not only in the increase of students and in the enlargement of the facilities for instruction, but also in the introduction of new and important features.

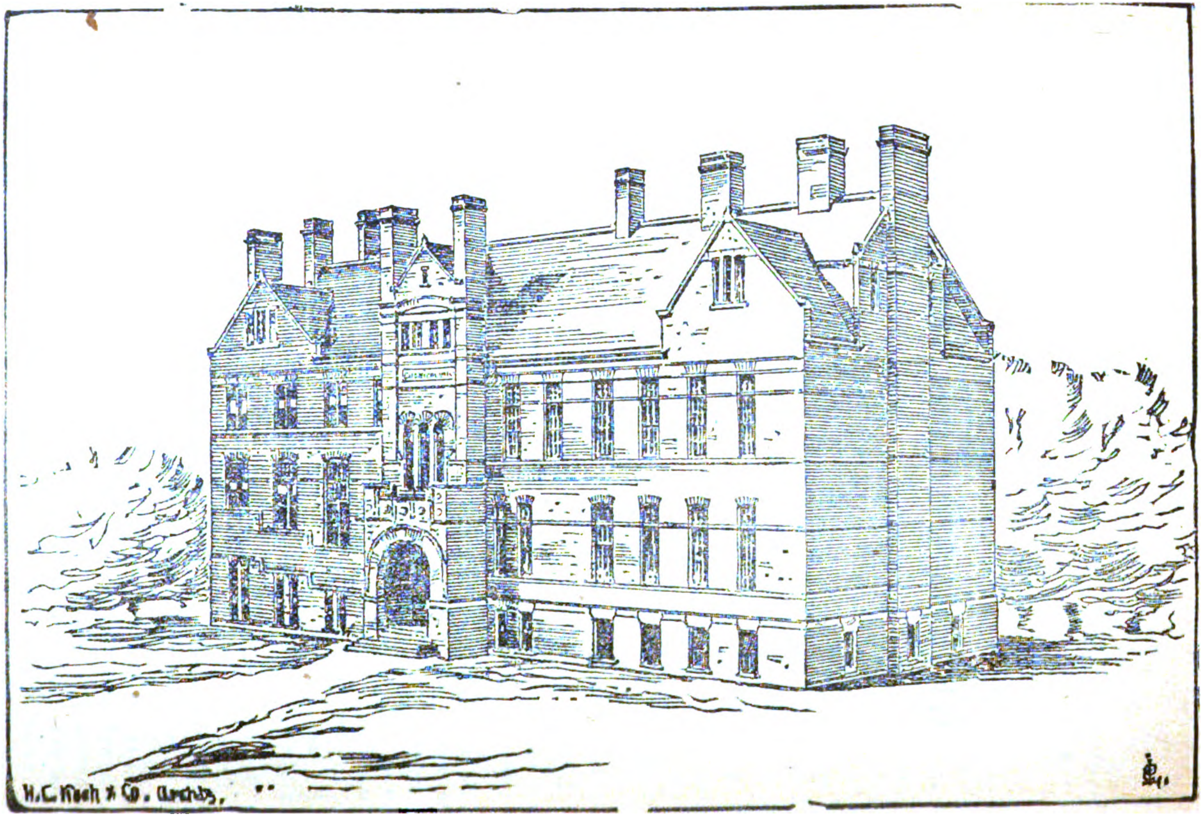
The increase in the number of students was fully twenty per cent., and these were distributed through the several departments in such a way as to show a well-balanced growth, and not an exaggerated development in some special line.

The completion of Science Hall — probably the finest building of its kind in this country — has added very greatly to the accommodations afforded for scientific work, and, by relieving the crowded condition of other buildings, has benefited nearly all departments. The purchase of large quantities of the very best modern apparatus and the addition of choice collections in the departments of metallurgy, mineralogy, geology, zoology, etc., together with a careful selection of laboratory manuals, of technical and scientific treatises, and of documents adapted to the work of the newly established *seminars*, have greatly increased the facilities for advanced instruction according to the best modern methods.

There have been added to the ten regular courses of study previously offered, three additional ones, namely, a special course in science antecedent to the study of medicine; a civic-historical course — or rather group of courses — antecedent to the study of law and journalism, and a group of special courses for Normal School graduates.

There has been introduced the German *seminar* system of work, which is intended to vitalize and extend the range of study, and to develop the spirit of original investigation in the historical, linguistic, literary, mathematical and other departments. This system has proved its superior efficiency in Germany, and has been introduced in a few of the foremost institutions in this country. It is believed that it will greatly stimulate and broaden the work in the literary departments, very much as laboratory methods and original research have done in the scientific departments.

There have been established eight University fellowships, and a ninth has been endowed by the liberality of the Hon. John Johnston, of Milwaukee. These fellowships are not to be mistaken for the ordinary under-graduate scholarships, as they are liable to be, since this is the first institution in the interior to establish them. They are open only to


H. C. Koch & Co. Archts.

THE CHEMICAL LABORATORY.

graduates from the regular courses, and provide for an extension of work at the University for two additional years. They will have the practical effect of elevating the range of the University courses to that extent. It is putting an added story on the intellectual edifice. The work will be of a higher order in kind as well as in subject, and will embrace original independent research.

There has been an enlargement of the facilities for independent and original inquiry in various lines, and this important phase of modern education has been industriously fostered. Notable additions to the equipment for such work have been made in astronomy and bacteriology, but the most important have been in the line of agricultural investigation. The equipment of the Experiment Station has been greatly increased. South Hall, which had been previously occupied in part by the agricultural department, has been wholly assigned to it, and has been, in large part, overhauled and refitted, and now furnishes very commodious apartments for it. The laboratory facilities have been fully doubled. New apparatus and a large invoice of important foreign works have been purchased.

A chair of agricultural physics, the first of its kind in this country, has been established, and work in this important department has been inaugurated. The professor occupying this chair will not only engage in original investigation, but will devote special attention to the development of the educational functions of the department, and will give instruction to agricultural students in the physical principles involved in farming operations.

That the growth of the institution is not tending unduly toward the professions and sciences is shown by the development during the year of courses in four additional languages as well as by the introduction of the *seminar* system and the post-graduate courses above alluded to.

Of like import is the establishment of a chair of experimental and comparative psychology — one of the very few in existence — through which an effort will be made to place the supremely important department of mental science in the foremost rank, and to introduce into this field, which has heretofore been so largely occupied with philosophy and speculation, the solid elements of experimentally determined science.

Some important changes have been made in the previously established courses, giving them greater elasticity and affording facilities for consecutive thoroughgoing study in selected lines. There has also been an enlargement of the number of elective studies, so that it is now possible for a student to modify any of the courses to suit his own mental characteristics and preferences to a very important extent. By taking advantage of elective studies there are really open to students an almost indefinite number of courses.

There has been an extension of the system of degrees corresponding to the extension of the University work, and the instructional force has been strengthened.

Some new regulations have been adopted regarding admission to the University, including a system of special local examinations. The standard of admission to the regular college classes, while not changed nominally, has in reality been raised.

THE PROFESSIONAL COURSES.

THE LONG COURSE IN AGRICULTURE.—For some years past the University has offered an extended course in agricultural science, embracing, also, long courses in the closely related sciences. If the opportunities thus afforded had been embraced and industriously followed up, it would have proved a most wise choice to a score or more of talented young farmers' sons. There is just now, probably, a greater demand for thoroughly educated talent in agricultural science than in any other branch of learning. The rapid development of agricultural experiment stations throughout the country creates an exceptional call for ability and skill in that line, and if a few dozen Wisconsin boys who had the native talent had embraced the opportunity, they might now be putting shekels in their pockets and doing the world good and their State honor, at the same time. This course has been reconstructed during the past year, and is now offered with increased and constantly increasing facilities. How long shall it wait for due appreciation?

THE SHORT COURSE IN AGRICULTURE.—To meet an entirely different educational need, a *Short Course in Agriculture* is offered, designed to give, in the briefest time and at the smallest expense, the most available agricultural information. A special statement respecting the course may be found elsewhere in this bulletin.

POPULAR EDUCATION.—But the University is not content to simply rehearse old agricultural doctrines. Its chief effort is to develop new agricultural science and to disseminate it. This it endeavors to do in the most direct and practical way; first, by careful experiments and exact analyses to determine the precise truth, and secondly, by conveying this directly to the farmers by publications and by Farmers' Institutes, so that the *farmers themselves* are coming into direct relationship to the University. It might be too much to say that they are becoming non-resident students of the University, but it may at least be said that they receive information and instruction directly from it. The work of the Experiment Station is best shown by its fruits, and the most of those who read this will, doubtless, also read its reports and know for themselves. As to the work of the Farmers' Institutes this BULLETIN is a witness. In many respects the Farmers' Institutes constitute the most important educational movement of the past decade. That which is taught in them is practical, stimulating, vitalizing, and is probably productive of more thought, observation, inquiry, experimentation and reflection than an equal amount of instruction in any regular educational institution; and, while the amount is limited, the very large numbers in attendance make the total result very great. An institution which directly reaches 50,000 interested truth-seekers is something phenomenal.

LAW COURSE.—The location of the Law Department gives it exceptional advantages. Provided with rooms in the capitol, it is right in the midst of courts, legislative halls and executive offices, right among law-makers, lawyers and judges. Besides its own library the state law library (20,000 vols.), and the great historical library (116,000 vols.), are immediately at hand. Under these conditions the Law Department has had a rapid growth and is attaining a wide reputation.

THE CIVIL ENGINEERING COURSE. A full four years' course, embracing practical field-work, is offered and shorter special courses are permitted. The facilities are of the first order and are continually being improved.

THE MECHANICAL ENGINEERING COURSE.—The University endeavors to meet the growing demand for mechanical knowledge and skill of the higher order, both theoretical and practical, by furnishing a full four years' course in mechanical science, embracing extended courses in drawing, shop practice and practical testing. It has been found difficult to enlarge the facilities for shop practice fast enough to meet the demand for this popular element of modern education coming, as it does, from students in all the courses.

THE MINING ENGINEERING AND THE METALLURGY COURSES.—A four years' course is offered in mining engineering and also in metallurgy and assaying. These courses have suffered for want of facilities since the burning of old Science Hall, but the new buildings more than compensate for this, and a growth in these departments commensurate with the recent development of mining interests is anticipated.

THE PHARMACY COURSE.—An excellent course in Pharmacy, embracing practical laboratory work, is presented and is well patronized.

* * *

CULTURE COURSES.

THE ANCIENT CLASSICAL COURSE.—This course has demonstrated its merits through the experience of the ages and has so many warm friends and stalwart advocates that it needs no commendation here. It is a course in which Greek, Latin and mathematics form the chief agents of culture.

THE MODERN CLASSICAL COURSE.—In this, German, French and other modern languages are substituted for Greek, and thereby the gates are open to the intellectual treasures stored in the European languages, and the means of intercourse with the great peoples of the Continent afforded.

THE ENGLISH COURSE.—This is a comparatively new course, in which, while foreign and ancient languages are offered, the chief emphasis is laid upon our own tongue, the richness and disciplinary powers of which are often overlooked in our admiration of other great languages.

In all these courses mathematics holds a high place, and considerable attention is given to the various physical sciences. Through the electives offered the ratio of these may be largely increased.

THE GENERAL SCIENCE COURSE.—In this the leading place is taken by the natural sciences, embracing chemistry, natural philosophy, physiology, biology, zoology, botany, astronomy, mineralogy, geology and kindred branches, the value of which needs no advocacy in these days of extraordinary utilization of science. With these are also offered extended courses in higher mathematics and the modern languages, especially German and French.

The foregoing are general culture courses intended to give a broad and liberal education while differing somewhat in their chief tendencies. All afford a wide range of study, rich in knowledge and discipline. The three following courses have been introduced during the past year with a view to adapting this general culture to professional courses in medicine, law, journalism and teaching:

THE PRE-MEDICAL COURSE.—In response to a request from the Wisconsin State Medical Society, the University offers a special course in science adapted to those comtemplating the study of medicine and surgery. It embraces long thorough courses in chemistry, physics. anatomy, histology, zoology, botany and kindred branches, which are intended to give a broad and solid foundation for the professional medical course, while at the same time they give a due measure of collegiate culture.

THE PRE-LEGAL AND PRE-JOURNALISTIC COURSES.—For the accommodation of those contemplating the study of law or journalism, extended courses in civil polity, economics and historical science, together with literary and philosophical branches, have been arranged so as to constitute the work of the Junior and Senior years of the collegiate course. Students are thus enabled to profit by an adaptation of their college course to their future work without essential deviation from the general purposes of collegiate training.

SPECIAL COURSES FOR NORMAL SCHOOL GRADUATES.—To afford graduates of the State Normal Schools facilities for extending their studies advantageously, and at the same time to attain a recognized standing leading to a degree, without loss of time or inconvenience arising from the want of adjustment of their previous studies to the standard college courses, special courses have been adopted by the University by which two additional years of successful study will enable graduates from the advanced Normal courses to graduate from the University with a degree.

GENERAL FACILITIES.—The Faculty embraces upwards of fifty instructors. The laboratories are new, extensive and well equipped, embracing the chemical, physical, metallurgical, mineralogical, geological, zoological, botanical, civil and mechanical engineering, agricultural and pharmaceutical laboratories. *Seminars* for advanced study in history, language, literature, mathematics, and other branches are being developed.

The libraries accessible to students embrace that of the University, 16,000 volumes; of the State Historical Society, 123,000 volumes; of the State Law Department, 20,000 volumes; of the City, 9,000 volumes, besides special professional and technical libraries, thus affording very exceptional opportunities for reading and special research.

S
129
.F3

WISCONSIN

39087

FARMERS' INSTITUTES;

A HAND BOOK OF AGRICULTURE.

NO. 4—1890.

EDITED BY

W. H. MORRISON, Superintendent.

MADISON, WISCONSIN:
DEMOCRAT PRINTING CO., PRINTERS AND STEREOTYPERS.

Entered according to act of Congress, in the year 1890, by W. H. MORRISON, in the office of the Librarian of Congress, at Washington.

TABLE OF CONTENTS.

Page.
Letters of Transmittal ... vi
University of Wisconsin ... vii
  Branches of Study ... viii
  Short Course in Agriculture ... x
In Memoriam, Hon. Hiram Smith, by H. C. Adams ... xv
Arrangement of the Stable and Methods of Tying, by L. H. Adams ... 1
Manure, by H. C. Thom ... 8
Care of the Cow at the Time and After Calving ... 14
Fallacies in Breeding, by Geo. Wylie ... 17
Principles of Breeding, by Gov. W. D. Hoard ... 20
How to Make a Dairyman, by T. J. Fleming ... 27
How to Rear a Dairy Herd of Cows, by C. P. Goodrich ... 32
Butter Making on the Farm, by Thos. Convey ... 38
Temperature in Butter Making, by D. W. Curtis ... 42
My Dairy Experience, by James McPherson ... 49
How Have Our Great Dairy Cows Been Bred? by T. L. Hacker ... 51
Is It Necessarily Hard Times for Good Farmers? by C. R. Beach ... 57
Food Adulteration, by H. C. Thom ... 63
Agricultural Depression, by Gov. W. D. Hoard ... 67
Saving and Application of Manure, by John M. True ... 72
Silo Experience, by L. H. Adams ... 82
Silo Experience, by Weldon Van Kirk ... 85
How to Breed and Fatten Swine, by Geo. Wylie ... 94
Experiments in Pig-Feeding, by L. H. Adams ... 101
How Can We Make Pork at Low Cost? by Thos. Convey ... 108
Profitable Pork Making, by E. M. Snow ... 111
Deerfoot Farm Pork Products, by James Cheesman ... 114
The Horse Market, by John M. True ... 117
The Breeding of Draft Horses, by Alex. Galbraith ... 119
A Word About Coach Horses, by A. O. Fox ... 122
Can the Wisconsin Farmer Profitably Breed Roadsters? by Hon. J. M. Mitchell ... 125
Wasteful Management of Farms, by Hiram Smith ... 128
Potato Experience, by J. M. Smith ... 131
Breeding and Feeding for Beef, by Peter Wakem ... 140
Can Beef be Produced in Wisconsin at a Profit? by H. C. Thom ... 149
Future Prospects as to the Price of Beef, by Geo. Whicher ... 152
Profitable Sheep Husbandry, by W. H. Cole ... 155
What Kind of Sheep Are Best Adapted to Wisconsin? by A. O. Fox ... 161
Best Methods of Breeding, Feeding and Marketing Mutton Sheep, by Geo. McKerrow ... 166
Early Lamb Raising, by R. C. Judson ... 171
Small Fruit Growing on the Farm, by J. M. Smith ... 173
The Good Farmer and the Poor Farmer, by Mrs. J. A. Clark ... 177
Some Helps to Home-Making, by Mrs. J. M. Smith ... 180
The Coming Farmer, by Hon. J. M. True ... 183
Wild Flowers, by Werden Reynolds ... 187
Gather Up the Fragments That Nothing May Be Lost, by D. F. Sayre ... 187
Our Highway Laws and Country Highways, by D. E. McGinley ... 194
Noxious Weeds, by Dr. R. J. Wilcox ... 198
Clover, by C. H. Everett ... 203
The Bee at Home, by Rev. James Bain ... 205
Home Education, by Alice Ball Loomis ... 207
Tobacco Culture, by Levi Kittleson ... 211
Corn Culture, by O. S. Sisson ... 215
Dairy Experience, by Dr. C. V. Porter ... 219
What We Girls Want, by Mrs. S. W. Getchell ... 220
The Future Farmer and Farm Wives, by Mrs. M. C. Oakey ... 222
What Shall We Read? by Mrs. M. McCoy ... 225
The Business Farmer, by C. W. Staples ... 228

INDEX TO ADVERTISERS.

	Page.
Arnold, A. A., Short-horns and Berkshire Pigs	265
Ames, A. R., seedsman	282
Advance Thresher Co., threshing machines	259
Adams, H. C., Jersey cattle	326-7
Appleton Manufacturing Co., horse power and grinding mills	277
American Road Machine Co	284
American Rural Home	302
Belle City Manufacturing Co., ensilage cutters, hay tools, etc.	323-4-5
Barnes, A. D., nursery stock	268
Butters and Peters Salt and Lumber Co.	319
Boyd, John, butter making	330
Breeders' Directory	234
Buyers' Guide	237
Case, J. I., Threshing Machine Co.	309
Chicago, Milwaukee & St. P. R'y Co.	248-9. 281
Chicago & Northwestern R'y Co.	255-6-7
Chicago, St. Paul, Minneapolis & Omaha R'y Co.	262
Chicago, Burlington & Northern R'y Co.	271
Clellan, C. S., American Merino sheep	290
Chapman, T. A. & Co., dry goods	336
Currie Brothers, seedsmen and florists	291
Convey, Thos., Poland China swine	260
Coe & Converse, nursery stock	305
Dunham, M. W., Percheron and French coach horses	Cover.
Dickinson, The Albert Co., seedsmen	278
Deming & Proctor, business college	290
Edwards, J. M. & Son, nursery stock	310
Farm, Field and Stockman	310
Farm Journal	331
Fox, A. O., horses, sheep and cattle	242 to 247 and Cover.
Fox, William, choice grapes and grape vines	253
Fuller & Johnson Manufacturing Co., agricultural implements	254, 333-4-5
Fleming Manufacturing Co., road machines	307
Farmer, Prairie Co., agricultural newspaper	283
Farmer's Review, agricultural newspaper	316
Farm, Stock and Home, agricultural newspaper	312
Green Bay, Winona & St. Paul R'y Co	285
Genesee Salt Co	317
Hansen, Chris., butter color and rennet extract	294
Hacker, T. L., Jersey and Guernsey cattle	311
Hamilton, C. H., blackberries, raspberries and currant plants	313
Hoard's Dairyman	296
Ill. Central R. R	293
Iowa Homestead	289
Jacobs, W H., Short-horn cattle and Berkshire pigs	298-9
Johnson & Field Co., fanning mills and rollers	267
Judd Orange Co., agricultural books	328-9
Kelley, T. L. & Co., dry goods	280
Keystone Manufacturing Co., agricultural machinery	286-7
L. S., St. P. & U. P. R'y	263
Meyer & Schrage, agricultural machinery	275
Morgan, James, dry goods	295
Mitchel, John L., horses and Jersey cattle	264
Milwaukee & Northern R'y Co.	272
McFarlane Carriage Co	301
Miller, C. B. & Co	303
Milwaukee, Lake Shore and Western R'y Co	279
Morrow, Dr. William & Son, Jerseys	275
McKerrow, Geo., Shropshire and Oxford Down sheep	292
National Stockman and Farmer	314
Northern Pacific R'y Co	288
Ogilvie, R. B., Clydesdale horses	257a, 258a
Ohio Farmer	241
Pabst, Fred, Percheron horses	251
Reid Bros., English Shire and Clydesdale horses	259a

	Page.
Rosencrans & Thatcher Co., watches and jewelry	250
Rowell, J. S., Manufacturing Co., agricultural machinery	306
Ross, E. W. & Co., ensilage cutters	270
Roe, D. H. & Co., dairy supplies	274
Sheldon, The S. L. Co., agricultural machinery and carriages	304
Southern Cultivator	276
Salzer, John A., seedsman	270
Stafford, W. K. & Co., crockery	332
Schroeder, Gustav, Victoria swine	294
Soo Line, S. M., St. P. & St. M. R'y	273
St. Paul & Duluth R'y	308
Thayer, M. A., blackberries, raspberries and currant plants	321
The Country Gentleman	256a
Tuttle, A. C., nursery stock	315
The Youth's Companion	297
Uihlien Bros., standard bred trotting horses	258
Urquhart, John, Holstein and Jersey cattle	261
U. S. Wind Engine and Pump Co., agricultural machinery	269
Universal Weeder Co	322
Valerius, Dr. & Co., Clydesdale, English Shire and Percheron horses	252
Wisconsin Central R'y Co	266
Wardell, Bushnell & Glessner Co., mower and binder	Cover.
Western Rural	320
Western Stockman and Cultivator	318

LETTER OF TRANSMITTAL.

Hon. Geo. Raymer,

President of Board of Regents, University of Wisconsin:

Sir:—I have the honor herewith of presenting to you Bulletin No. 4, Wisconsin Farmers' Institutes. The Agricultural Institutes conducted under the auspices of our State University speak for themselves in this volume. They speak for the growing interest which the farmers themselves are taking in those things, which will elevate the standard of Wisconsin Agriculture to its true place among the enterprises of our people, and give to the labor of the farm the standard of rank to which it is entitled in the world's battle of labor and enterprise.

That this is true is seen in the fact that the gems of practical thought with which this volume abounds, are emanations from those who have forged their ideas upon the anvil of their own experience, and have voiced them in expression born of an enthusiasm worthy of their calling, and worthy of an imperishable keeping.

This volume is peculiarly the product of the farmers of Wisconsin — and as such I am pleased to present it to you, that it may be sent out on its mission work.

Respectfully yours,

W. H. MORRISON, *Sup't.*

Madison, Wis., July 9, 1890.

UNIVERSITY OF WISCONSIN.

BOARD OF REGENTS.

THE STATE SUP'T OF PUBLIC INSTRUCTION, *Ex-Officio.*
THE PRESIDENT OF THE UNIVERSITY, *Ex-Officio.*
GEORGE RAYMER (3d District), *President.*
WM. P. BARTLETT (8th District), *Vice-President.*

STATE-AT-LARGE,	L. S. HANKS, *Ch'm. Ex. Com.*
STATE-AT-LARGE,	FERDINAND KEUHN.
FIRST DISTRICT,	CHARLES R. BEACH.
SECOND DISTRICT,	JOHN A. RICE.
FOURTH DISTRICT,	GEO. H. NOYES.
FIFTH DISTRICT,	JAMES H. MEAD.
SIXTH DISTRICT,	FRANK CHALLONER.
SEVENTH DISTRICT,	JOHN M. TRUE.
NINTH DISTRICT,	E. L. BROWNE.

E. F. RILEY, *Secretary.*

Committee of Board of Regents in Charge of Farmers' Institutes.

HON. JOHN M. TRUE, *Chairman,*	BARABOO.
HON. JOHN A. RICE,	MERTON.
HON. C. R. BEACH,	WHITEWATER.

W. H. MORRISON,	MADISON.

SUPERINTENDENT OF AGRICULTURAL INSTITUTES.

OFFICERS OF THE STATION.

T. C. CHAMBERLIN,	PRESIDENT.
W. A. HENRY,	DIRECTOR.
S. M. BABCOCK,	CHIEF CHEMIST.
F. H. KING,	PHYSICIST.
E. S. GOFF,	HORTICULTURIST.
F. W. WOLL,	ASSISTANT CHEMIST.
LESLIE H. ADAMS,	FARM SUPERINTENDENT.
S. R. BUCEY,	CLERK AND STENOGRAPHER.

UNIVERSITY OF WISCONSIN.

COLLEGES.

College of Letters and Science,
College of Agriculture,
College of Mechanics and Engineering,
College of Law,
School of Pharmacy.

COURSES.

Long Agricultural Course,
Short Agricultural Course,
Mechanical Engineering Course,
Civil Engineering Course,
Mining and Metallurgical Engineering Courses,
Railroad Engineering Course,
Electrical Engineering Course,
Law Course,
Pharmacy Course,
Ancient Classical Course,
Modern Classical Course,
General Science Course,
English Course,
Civic-Historical Course, antecedent to Law and Journalism,
Special Science Course, antecedent to Medicine,
Special Courses for Normal School Graduates.

BRANCHES OF STUDY.

The University presents a very wide range of study, embracing one hundred and seventy-three subjects of study, known as sub-courses. Something of the extent and variety of these may be indicated by the following synopsis: Eleven languages are taught, viz.: Greek, Latin, Sanscrit, Hebrew, German, Norse, French, Italian, Spanish, Anglo Saxon and English. In Mathematics there are twenty-one special courses. Under the Sciences there are a variety of courses in each of the following: Astronomy, Physics, Chemistry, Geology, Mineralogy, Zoology, Botany, Bacteriology. In History there are nine courses; in Civics eight;

in Mental Science there are twelve, embracing Psychology, Ethics, Aesthetics and Logic. There are six courses in Pedagogics, and courses in Military Drill, Hygiene, Sanitation and Music.

In Mechanics and Engineering:— Elementary Mechanics, Mechanics of Material, Mechanics of Machinery, Theory of Construction, Thermodynamics, Elementary Surveying, Railroad and Topographic Surveying, Geodesy, Sanitary, Hydraulic, Railroad, Electrical, Mining and Metallurgical Engineering, Steam Engine, Hydraulic Motors, Hoisting Machinery, Theory and Construction of Locomotives, Railway Locomotives, Railway Location, Railway Equipment, Construction and Maintenance of Way, Railroad Field Work.

In Electricity:—Electrical Testing, Electrical Plants, Electrical Construction and various forms of drawing are given; also, shop work in wood, iron, brass, both hand work and machine work, machine designing, construction and testing machines.

In Agriculture:— Various courses are given in agriculture: Animal Husbandry, Farm Management, Agricultural Chemistry, Veterinary Sciences, Agricultural Physics, Horticulture and Economic Entomology, etc.

In Law:— Courses in Equity, Jurisprudence, Real Property, Constitutional Law, Wills, Contracts, Torts, Practice and Pleading, Law of Evidence, Corporations, Domestic Relations, Admirality, Insurance, Estoppel, Partnership, Taxation, Criminal Laws, Common Carriers, Medical Jurisprudence, etc.

In Pharmacy:— Courses in Practical Pharmacy, Pharmaceutical Chemistry, Materia Medics, Pharmaceutical Botany, and Practical Laboratory Work.

General Facilities:—The Faculty embraces upwards of sixty instructors. The laboratories are new, extensive and well equipped, embracing the Chemical, Physical, Metallurgical, Mineralogical, Geological, Zoological, Botanical, Civil and Mechanical Engineering, Agricultural and Pharmaceutical Laboratories. *Seminars* for advanced study in History, Language, Literature, Mathematics, and other branches are being developed.

The libraries accessible to students embrace that of the University, 23,000 volumes; of the State Historical Society, 138,000 volumes; of the State Law Department, 23,000 volumes; of the City, 11,000 volumes, besides special professional and technical libraries, making in all more than 200,000 volumes, thus affording very exceptional opportunities for reading and special research.

For further information send for a catalogue, or address the President or the head of the department concerning which information is desired.

UNIVERSITY OF WISCONSIN.

SHORT COURSE IN AGRICULTURE.

The University of Wisconsin offers young men two courses of instruction in agriculture; first, a Short Course to accommodate those young men who desire to gain a better knowledge of the science of agriculture, but who can give but a limited time to preparation; and, second, a long course designed to meet the needs of all young men desiring the liberal and scientific training essential to the best life on the farm, and to those who desire to become specialists in some department of agricultural science.

THE SHORT COURSE.

Sixty lectures, mainly devoted to Feeding and Breeding, by Prof. W. A. Henry.

Sixty lectures on the Elements of Agricultural Chemistry, by Dr. S. M. Babcock.

Sixty lectures in Horticulture and Economic Entomology, supplemented with laboratory work, by Prof. E. S. Goff.

Sixty lectures and laboratory exercises on Agricultural Physics and the Physical Features, Climate and Meteorology of Wisconsin and the United States, by Prof. F. H. King.

Thirty-six lectures on the Anatomy of Domestic Animals, by Prof. V. T. Atkinson, State Veterinarian.

A course of 120 hours in practical mechanics, by Sup't C. I. King. This course embraces work in the University Machine Shops, covering bench work in wood, wood turning and blacksmithing.

A COURSE IN PRACTICAL DAIRYING.

This course is designed to give practical instruction in the manufacture of butter and cheese to those who are preparing themselves for the management of private dairies, creameries and cheese factories. For its use a commodious dairy house is thoroughly equipped with the most improved apparatus. A large laboratory is also provided, where practical instruction is given in the use of the lactometer, lactoscope, oil test, Short's test, the Iowa Station test, the Babcock test and other methods of testing milk that are applicable to creameries, cheese factories and private dairies.

The facilities now provided to make the Short Course an intensely practical and profitable one for young farmers are very excellent.

A reading room and library are provided in which students will find the standard works on agriculture, and files of seventy of the leading agricultural periodicals, nine of which are from Europe. The lecture room is provided with an electric light, so that lantern slides illustrating the lectures may be used.

The famous Auzoux life-sized model of the horse, which can be dissected to show the separate nerves, muscles, blood vessels and bones, will be used to illustrate the lectures on anatomy.

The course opens January 5th, 1891, and lasts twelve weeks.

For particulars regarding the Short or Long Courses in Agriculture, address
PROF. F. H. KING, MADISON, WIS.

For particulars regarding other courses in the University, address PRESIDENT T. C. CHAMBERLIN, who will send you a catalogue giving full information as to any course of study.

LAW PROVIDING FOR AGRICULTURAL INSTITUTES.

(*Original Enactment, Chapter 9, Laws of 1885.*)

CHAPTER 62, LAWS OF 1887.

AN ACT Relating to Agricultural Institutes, and Amendatory of Chapter 9, Laws of 1885.

The people of the State of Wisconsin, represented in senate and assembly, do enact as follows:

Section 1. The board of regents of the state university is hereby authorized to hold institutes for the instruction of citizens of this state in the various branches of agriculture. Such institutes shall be held at such times and at such places as said board may direct. The said board shall make such rules and regulations as it may deem proper for organizing and conducting such institutes, and may employ an agent or agents to perform such work in connection therewith as they deem best. The course of instruction at such institutes shall be so arranged as to present to those in attendance the results of the most recent investigations in theoretical and practical agriculture.

Section 2. For the purposes mentioned in the preceding section, the said board may use such sum as it may deem proper, not exceeding the sum of twelve thousand dollars in any one year, from the general fund, and such amount is hereby annually appropriated for that purpose.

Section 3. This act shall take effect and be in force from and after its publication.

Approved March 16, 1887.

Madison, Wis., July 1, 1890.

Hon. C. E. Estabrook, Madison, Wis.:

Dear Sir:— It is my purpose to include in the forthcoming Bulletin some account of the life of the late Hon. Hiram Smith, and of his services to the farmers of the state of Wisconsin, and in connection with this subject it seems appropriate to have from you, as the author of the law providing for Farmers' Institutes, some account of its origin.

Yours truly,

W. H. MORRISON, *Sup't.*

MADISON, WIS., July 9, 1890.

HON. W. H. MORRISON, Madison, Wis.:

DEAR SIR: — I am in receipt of your note of the 1st inst., relating to the origin of the Farmers' Institutes in this state. I presume you want to know how I came to think of the matter. I cannot tell exactly when the plan which was finally adopted became fully formulated in my own mind. It will perhaps best serve your purpose for me to state briefly the circumstances and conditions which suggested and preceded the drafting of the enactment in question.

In the early part of October, 1884, I listened to a short address by the late Hon. Hiram Smith to the farmers of Manitowoc County, on the grounds of the Industrial Association near the city of Manitowoc. The address was very practical, and one which any person of common intelligence could readily understand; and at the same time it was replete with information of the most valuable kind to the persons to whom it was addressed. It was in fact the summing up of years of valuable experience and study, and was being given under the most adverse circumstances, amid the noise and confusion of the fair ground. The first thought that occurred to me was, what a pity that the valuable experience of a successful life should be given out in such an unsatisfactory manner, and that no effort should be made to preserve the knowledge thus gained. That in a few short years, at most, the speaker would be no more, and that the result of forty years of earnest labor and success would then be lost. It then occurred to me that I would endeavor to get up a meeting of farmers of our county at some future time and invite Mr. Smith to address them under more favorable conditions. I had not considered this proposition long until it occurred to me that if such a meeting would be advantageous to the farmers of Manitowoc County it would be advantageous to the farmers of other counties in the state as well, and that if such a work should be undertaken it should be extended throughout the state. To do this required some organization; thus one idea led to another until the whole as it became a law was distinctly outlined in my mind.

This is as near as I can give the genesis of the law relating to Farmers' Institutes in this state; and while Mr. Smith had nothing to do in devising the scheme, it was his address that set the train of thought in action which gave birth to the plan which we finally adopted. As a matter of course, I had given the subject of education and agricultural education some thought prior to that time, and was familiar with the efforts in various localities to organize farmers' conventions and farmers' clubs, and I was also familiar with the work being done by the Dairymen's Association, Horticultural Society and other kindred organizations. These societies and organizations and the labor of many individuals, including Mr. Smith, undoubtedly served to prepare the way for the Institutes. As soon as Mr. Smith's attention was called to the subject of the proposed Institutes, he at once recognized the value and promise of good to come therefrom. He said: "It is just what we want," and to his energy, skill and judgment a great deal of the success which has been attained in the direction indicated is owing. To us who survive him, while keeping his memory reverently, it will be no small satisfaction that we were instrumental in devising ways and means by which the fruit of his experience was preserved to the people of our state.

Yours truly,

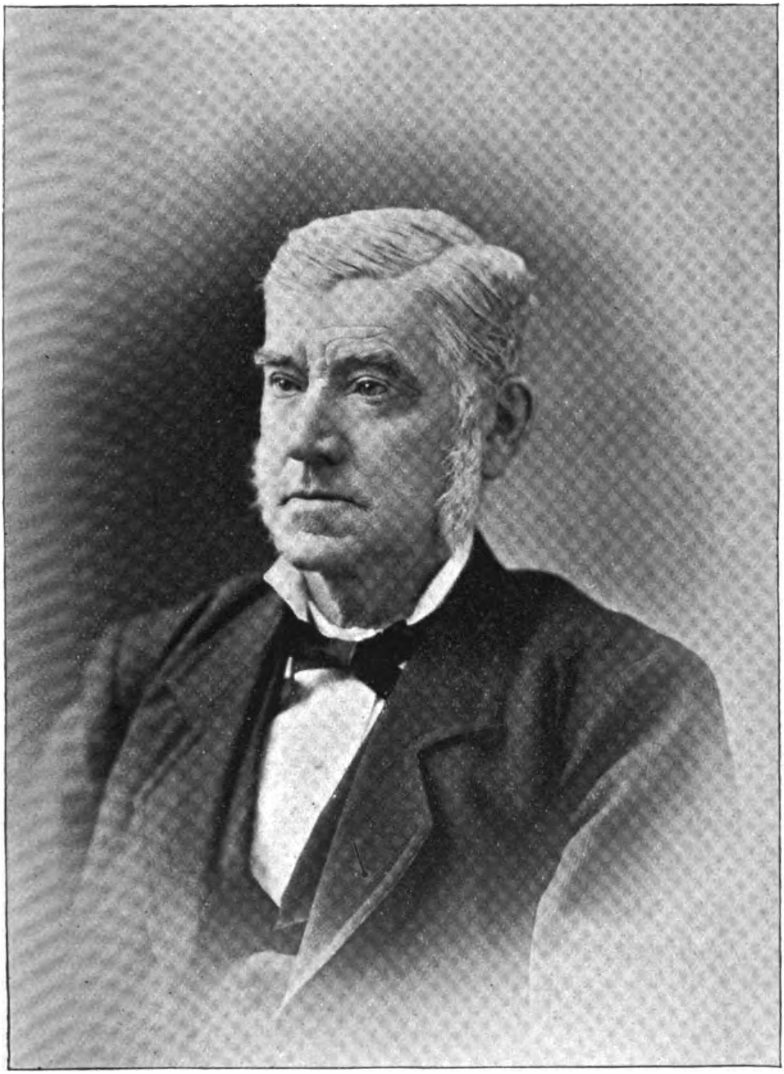
CHARLES E. ESTABROOK.

In Memoriam.

Hiram Smith was a strong man. He was strong in his judgment, strong in his will, strong in his friendship, strong in his hatred of sham and hypocrisy and singularly sincere and strong in his love for right reason. He placed many well formed and solid blocks in the foundation of Wisconsin's agricultural prosperity. He made his own fortune with his own hands and with a mind untrained in the wisdom of the schools. He was self made but he did not worship his maker as is frequently charged against men of this class. His keen thought cut as clearly through the follies of conceit as through the slush of bad logic. He loved men and hated walking mummies as thoroughly as any man on earth. His broad public spirit was his grandest characteristic. The great ambition of his later life seemed to be to help his fellow farmers everywhere, to better fortunes and happier lives. In his own life he had felt the burden of poverty and the burden of thoughtlessness. With his strong will he had trodden them both under the feet of knowledge, and for years he was a teacher of men, that they might profit by the lesson he had taught himself.

No man knew better than he the hard side of the farmer's business as commonly followed, its grinding economies, its unceasing toil, its harrowing isolation, its often profitless labors, its unbusiness-like methods. The farmers listened to him because they felt he was one of them. No cultured graduate of a college could quite do what he did in stirring the dormant mental energies of his class. No man denounced more mercilessly than he, the faults which he found there, and yet no man could have a stronger faith in the possibilities of the average farmer's mind when stirred to action, than he had. For ten years before his death he had been one of the leading authorities in the dairy world. His farm had been a practical experiment station, doing gratuitous and valuable work for every person who kept a cow. His work and his style of stating the ideas upon which it was based made him a correspondent eagerly sought by the leading agricultural journals of the United States. The State Dairymen's Association of Wisconsin is one of his monuments. Through it he has reached nearly every farm in the state, to a very large extent it is due to him that this organization has been kept steadily to its purpose, the education of farmers and the upbuilding of a great material interest. His generous character has helped to keep it free from the poison of envy and the stupidity of personal jealousy. His practical wisdom has made it a fountain of knowledge that has grown clearer and greater with each succeeding year. No person not a member of that association can understand the tenderness and strength of that feeling in its ranks which will be ever loyal to the memory of Hiram Smith. He was a friend of young men. Age never numbed the touch of his sympathies. His mind never grew old. He never caged himself in a prison of memories. As a regent of the University for twelve years he did a most effective work. Steadily he labored to build up the agricultural department and make it worthy of the institution and of the state. He has helped most ably to bring our Experiment Station to its present high rank. He lived long enough to see the first dairy school in the United States established under his direction. The Wisconsin Farmers' Institutes came as the outgrowth of his thought. To them he gave a gratuitous and a splendid service. Thoroughly at home on an institute platform, with the voice and earnestness of an orator and the clear cut thought of a practical man of affairs, he brought truth and conviction to thousands of men who needed both. Hiram Smith was born February 19, 1817, in Tinicum, Bucks county, Penn. He was married to Catharine A. Conover, March 20, 1845, and came to Sheboygan County July 4, 1847. He died at his home in Sheboygan Falls, May 15, 1890, at the age of seventy-three. The friends whom he had loved in life and who loved him said the words of parting and gently laid him to rest. He will be ever honored for he had "the love of wisdom and the wisdom of love."

H. C. ADAMS.

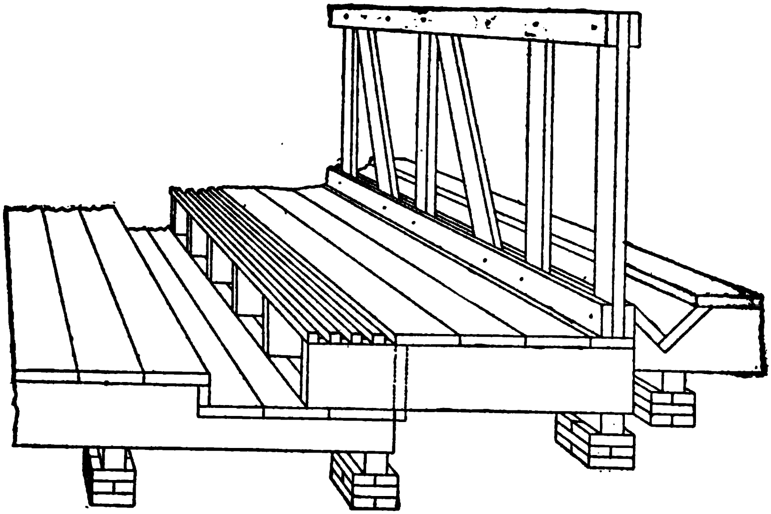


Hon. Hiram Smith

Morning Session--Tuesday, March 25.

ARRANGEMENT OF THE STABLE AND METHODS OF TYING.

By L. H. ADAMS, Supt. Experiment Farm.



Cut Showing Floor and Watering Trough in Dairy Stable.

Cleanliness.

The prime requisite in dairying is cleanliness. Without cleanliness in the stable it is useless to go further, for no matter how perfect our knowledge is regarding the making of milk and the handling of it, the setting of cream and churning, if we fail in a dairy stable we are gone. Therefore it is well to commence at the bottom and see that we get started right.

Stanchions.

We have had experience with several methods of tying at the station, but none have given such uniform success as the stanchion. There are opponents to the stanchion system of fastening cattle, but all things considered, I know of nothing that we can replace the stanchions with at the present day. We may get something that will supersede the stanchion before long, but in talking of these farm topics we must see that we keep within the bounds of practicability. If we advise something that is impracticable or beyond the reach of the average farmer it will do him no good, and in this talk I shall endeavor to combine all the points of practicability, as near as I can.

Stable Floor.

The floor that you see here represented on the diagram is essentially the same as the one in use at the Experiment Station farm to-day, and has been for the last three years. In putting this floor into our stable we took out a tight plank floor with a four-inch drop behind the cows; it was unsatisfactory. Our cows would get dirty in spite of a liberal amount of bedding used under them. This matter of bedding is a point that we must spend some thought upon if we wish to cut down the expense of dairying. Now, do not understand me as being opposed to the use of bedding; it certainly is a wise thing to do, but on the majority of dairy farms, where all the waste products are used, where nothing goes to waste, this question of bedding is a serious matter; we do not all have it. Farmers who utilize their oat crop, feed straw and all just the same as they would the timothy crop, and those who use the corn crop use the stalk and all, so you can readily see there is not much material left with which to bed a large herd of dairy cattle.

Now, with this floor you see represented here there is no absolute necessity in using bedding for the sake of cleanliness. There has not been a forkful of straw litter of any kind put on that floor in three year's time; and there is not a tag of manure or manure lock on the flank of one of the cattle.

The objection to the stanchion is the rigidity with which the cow is held in one position, the cattle being unable to turn around to lick themselves; but as every dairyman has it in his power to let his cattle out daily for exercise, this objection is not so bad as one would at first think. I would not advise stanchioning heavy beef animals, but should prefer not to fasten them at all but to feed them loose. But remember I am talking now of a stable and methods of tying for dairy cattle.

This floor here is six feet wide, and we can drive right in with a team and wagon and load the manure from the gutters on either side directly into the wagon. This floor that the animal stands upon is about 54 inches wide; our cows are grade Jerseys principally. This watering trough is made of two planks one 10 inches wide and the other 12, spiked together and the bottom of this trough is on a level with the floor on which the cattle stand. The trough has an incline of one inch to every twenty feet which is sufficient to carry the water entering this end to the other; there is an outlet at the further end through which the water runs after the cattle have finished drinking. Feed is given to the animals in this same trough. The drop is 12 inches, from the slats down to the bottom. Whatever urine is on this floor goes right through and is taken up with an absorbent that is thrown between the joists that support this floor. The solid part of the excrement is all left along in this drop. A cow in urinating will drop the water further forward than she will the solid part of the manure, so that in cleaning out it is not difficult if the manure is out here.

Absorbents.

For an absorbent we use horse manure. The horses stand over the cows and the manure is pushed through a hole daily down into the basement stable where the cows stand, and distributed along these gutters, and it takes up the liquid nicely and keeps the manure of the farm all together where it goes out. If, as I have explained, the urine passes through these slats, you can readily see how the cow lies down on a dry floor. I think you will all agree with me that lying down in a damp place is more objectionable than lying in solid excrement. I would rather see a cow lie in a pool of water, for in milking, no matter how careful you are about brushing, there will be a flavor that you cannot keep out of the milk.

DISCUSSION.

C. P. GOODRICH—Wouldn't you prefer to have your cows well bedded?

MR. ADAMS—Yes, I would prefer to have the cows bedded, provided I have the bedding, but, as I say, we utilize the waste product so closely that we do not have it.

C. P. GOODRICH—Don't you think it adds to the comfort of the cow?

MR. ADAMS—It does to a certain extent, undoubtedly.

C. P. GOODRICH—Wouldn't the platform be enough, so that you could dispense with the use of slats, if you have plenty of bedding?

MR. ADAMS—Straw will never take the place of slats at all.

C. P. GOODRICH—If straw was used on the slats the solid part of the manure would not be trodden through, and would dirty the cows up just as bad as though there were no slats there?

MR. ADAMS—Not so badly, for the reason that the urine would go down through. But there is no necessity of the cow lying in either the solid part of the excrement or the urine. The cow's feet should stand about over that second slat; that gives room enough for getting up and shifting position, without any extra exertion, and these slats aid the cows in getting up.

H. C. THOM—How far is it from the top of the slats to the bottom of the trench?

MR. ADAMS—It is twelve inches from the top of the slats down here; the cow steps up eight inches.

H. C. THOM—She never steps down into the trench?

MR. ADAMS—She never does; that is one objectionable feature that this floor overcomes; this floor being two inches longer than the plank floor does away with the cow stepping back and standing down here with her hind feet.

H. C. THOM—Do you ever have cows calve in the stanchions?

MR. ADAMS—No, sir; we always make a record of the date of service so that we always are warned and take the cow out of the stanchions; we have a hospital or box stall in the same basement barn that our cows are transferred to for at least a week previous to calving.

JOHN MARCH—Does the cow always comply with the record of the time she should calve?

MR. ADAMS—We have found that our animals do not vary more than from five to six days, and rarely ever as much as that.

CHAS. BRIGHAM—Of my cows one has calved three days less than nine months, and some have calved a few days over nine months and a half; now in such a case you would have to keep the cow in the box stall something over two weeks.

MR. ADAMS—Of course, in a normal condition a cow will not vary; but there are circumstances in which a cow will calve before or after, most always before.

GOV. HOARD—Do you allow your cows to calve in the stanchions?

MR. ADAMS—No, sir.

GEO. MCKERROW—Mr. Adams, what do you consider the best location for a dairy stable?

Mr. Adams—The stable should be located on ground sufficiently elevated to carry off the outside water and to be well drained. We don't want any more mud around our stable than is absolutely unavoidable, and the stable should be built with its long way east and west and on the south side we should have just as many windows as we can get in, to afford light.

Geo. Wylie—Does this method save all of the liquids of the manure?

Mr. Adams—It does, with the use of an absorbent as I have described.

Gov. Hoard—What do you use as an absorbent?

Mr. Adams—The manure from the horse stable.

Gov. Hoard—Do you use any land plaster in your stable?

Mr. Adams—We have used no land plaster; we have used lime.

Gov. Hoard—Why do you use lime?

Mr. Adams—We use it to take away the odor; it gives a sweet, pleasant smell to the stable.

Gov. Hoard—But lime is a disengagent of ammonia and land plaster is an absorbent of it.

Mr. Adams—We get all the liquid taken up in the horse manure.

Gov. Hoard—That is very true, but at the same time ammonia is a volatile gas and if you use lime you will disengage the ammonia by the action of the lime.

Mr. Adams—I don't want to be understood as deprecating the use of land plaster, there is no question but that it is a valuable thing to use. We use the lime because we have it on the farm more or less all the time in building operations. We had a lot left over that was slacked and we used it. If we were to buy an absorbent there is nothing that would be so effectual as land plaster.

Supt. Morrison—Don't you think it was a loss to use that lime?

Mr. Adams—I don't think we saved anything by the use of the lime. I think that the addition of lime itself to the soil is an advantage, however.

Gov. Hoard—That is true; but if you take manure and add lime to it, you will fire-fang the manure.

Question—Would slacked lime fire-fang the manure?

Gov. Hoard—Yes; it is the chemical action of the lime upon the constituent part of the manure, where all the ammoniacal parts are thrown out. You know when you are slacking lime how ammonia is disengaged and passes into the air, and the action of lime by dissolving in water upon the manure is destructive of the ammoniacal constituent of the manure. It disengages it. Land plaster is an absorbent of it; it becomes sulphate of ammonia, passes from sulphate of lime to sulphate of ammonia by the absorbing of ammonia.

Supt. Morrison—Give us your experience in reference to the matter of land plaster?

Gov. Hoard—I was led to the use of land plaster in stables from a study of its chemical affinities; finding that sulphate of lime had a powerful affinity for ammonia, then I thought to myself if it has so powerful an affinity for ammonia it ought to be valuable in the stable, where ammonia is being thrown off. I also noticed in handling horse manure, especially the bedding of a male horse, where the urine is thrown into the bedding under the horse, that when you take up the bedding in the morning it will often make your eyes smart and your nose sting, there is such a rise of ammonia in the air. Now that ammonia is worth seventeen cents a pound at wholesale, and New Jersey pays three million dollars a year for the purchase of manure for ammonia. Now, I said to myself, ammonia is worth saving; it is worth saving by using sulphate of lime in the stable. I had a crowded stable of thoroughbred cattle, and a horse, and part of the time two horses, and I wanted to make that stable as healthy as possible for those animals, and I knew the action of the land plaster in absorbing those gasses; it is a powerful absorbent. If you wish to try it step into a horse stable, and take a handful of land plaster and sprinkle it on some horse manure, and see how soon—in a second—it is gone. Go to a privy and no matter how rank it may be, and sprinkle land plaster on it, and see how quickly it is absorbed. Therefore it was of use to me in preserving the health of my animals and in the retention of this valuable component, worth 17 cents a pound at wholesale. I purchased a barrel of land plaster at $1.60, and it lasted with nine animals through the winter. I am confident it added to the manurial value of those animals that winter at least ten or twelve dollars. It is most valuable, and I cannot too strongly urge that it is a most valuable and paying thing to do—the purchase of land plaster and the sprinkling of it night and morning in the stable.

Fermentation in the manure heap, if too great, will produce fire-fang, which disengages elements that would be of value; land plaster retains them upon the land.

T. J. FLEMING—It seems to me that a cow going up on to that bed with no litter on it and constantly wet is liable to slip. I raise that question because the drop I have got is only seven inches and gives very good satisfaction.

MR. ADAMS—I would answer Mr. Fleming's question by saying that the drop we took out of our floor previous to putting this one in was four inches. We were obliged to take it out owing to the fact that the solid part of the manure in 24 hours would pile up to such a height that they had got to lie down in it. We increased the drop in another stable where steers were being fed to eight inches and the same objection was encountered there to a considerable extent. When we made up our minds to replace the old floor in the present dairy stable we put in this 12-inch drop and the cows never come in contact with the manure and we find no objection to the 12-inch drop, because the cows can get on to the floor readily; once up on that floor there is no occasion to step down until they go out of the stable and when we let them out we loosen the cows at one end of the stanchions and the cow turns around and walks on this floor and walks off here; she doesn't back off; she steps off.

T. J. FLEMING — Were those steers fastened with stanchions, where the drop was eight inches?

MR. ADAMS—They were fastened with chains around their necks that played up and down on a perpendicular pole.

T. J. FLEMING—I think that makes a difference as to the height of the drop, whether they are fastened with chains or stanchions. I don't think you will experience any trouble with milch cows with an eight-inch drop.

THOS. Convey—Is a slanting floor in a stable objectionable?

MR. ADAMS—I can't answer that question from experience. But when I could have a level floor that would answer the purpose of a slanting floor I would prefer that the cow stand on the level floor.

WELDON VAN KIRK—By the use of

this lime are you able to take away the odors of the stable entirely?

MR. ADAMS—Not entirely. We have got to depend upon ventilators to a great extent to carry off the foul odors of the stable.

WELDON VAN KIRK—What is the best way to ventilate a stable?

MR. ADAMS — Undoubtedly the best way is by running chutes or shafts of any size from a foot to two feet, that may be utilized for throwing feed down at the same time; run these from the top of the barn, where there is a free outlet, down to the basement of the stable and down to within two feet of the floor.

JOHN MARCH—Would dry earth with a little charcoal mixed be a good substitute for lime as an absorbent? We all have plenty of soil and can store a little and have it dry and use it in that way. I find it good.

MR. ADAMS—It would undoubtedly. Last fall we scraped up dust when it was extremely dry with us; we went out into the road and gathered up ten or twelve barrels of road dust and stored it away and are using it now as an absorbent behind young calves.

H. ROBBINS—What do you consider the best system of tying to use in an ordinary cow stable?

MR. ADAMS—That is the kind of a stable I am trying to talk about—an ordinary cow stable, and I think the present stanchion is the best system to use.

GOV. HOARD—Why do you like the stanchion?

MR. ADAMS—Because it will hold the cow in the best manner and enable us to keep her clean with the least trouble and most satisfaction.

GOV. HOARD—Do you think it a comfortable thing for the cow?

MR. ADAMS—For the average dairy animal, that does not weigh over seven to eight hundred to nine hundred pounds, where she may be let out daily for exercise, I don't consider it a bad practice to keep them in stanchions.

H. ROBBINS—Do you consider it necessary to the health of animals to lick themselves?

MR. ADAMS—That is undoubtedly a very natural proceeding; how necessary it is I am unable to say.

GOV. HOARD—Do you think it would be a good thing for you to be cramped up with your head and your neck between two rigid bars, and when you lay down, obliged by nature to turn your neck one way, and then be obliged by these scanchions to lie with your neck straight up and down?

MR. ADAMS—I will answer that question like a Yankee usually does by asking another. How can we fulfill the requirements of cleanliness in any other way than by the use of the stanchion, without confining her so that she will be able to raise herself as she does naturally in the pasture, and to lie down naturally—how will you do this with the same outlay for room in the stable? If you use box stalls you can't get as many animals in a given space. I don't say there are no disadvantages to the stanchion system, I don't claim it is natural for a cow to stand in a stanchion. Is it natural for her to be in a stable at all? Was the cow ever intended for a stable? We have got to restrict her in some sense by any tie that we employ. The question is, what is the best tie? One man will say this and another that.

GOV. HOARD—I want to ask how much space is allowed in your diagram for each cow, from backbone to backbone?

MR. ADAMS—Four feet is ample.

GOV. HOARD—I have a system, if you

will come over to the Executive barn, and I will show you a stable where two cows are kept so clean that on the flanks of one which is a little white you will scarcely find a stain, and I allow three feet and a half of space.

MR. ADAMS—As I said four feet is ample, and there are numerous stables where the space for cows in stanchions is not more than three feet.

GOV. HOARD—It seems to me that as the cow is a mother she ought to be handled with a constant regard for her comfort, and that a rigid stanchion is the most comfortable thing in the world for the man that owns the cow, but not for the cow herself.

MR. ADAMS—Undoubtedly the most comfortable way of handling cattle would be for them to run loose; that is the system that I should advocate if it were a practicable one. I would allow the animal perfect liberty. But that would require too much space and would necessitate this practice of dehorning to a considerable extent. It seems to me, with our present knowledge, there is nothing at the present time on the average dairy farm, where there are from 25 to 50 animals kept, that will supersede the stanchion. I hope we will have something better in the future. I know a man in the state of Washington who is going into the dairy business. He objects to the stanchion, and what does he substitute for the stanchion? He has a chain running the entire length of his stable just in front of his feed manger, and he ties the cows to the chain. She can't turn her head to the right or left to turn around and lick herself any more than she can in the stanchion, and in getting up or lying down they are apt to get their heads over or under that chain; they are more liable to accident. He has confined his cows in just about as rigid a manner as if he had put them in the stanchion, and he hasn't the benefit of the advantages the stanchion offers.

GOV. HOARD—We haven't said anything yet about your watering trough.

MR. ADAMS—The watering trough is made of two plank, one twelve inches wide and the other ten inches wide. The trough inclines an inch to every twenty feet. The water runs in through a pipe from the tank, which is about a foot above the level of this trough in the barn, and runs the entire length of the trough and the animals stand in the stanchions and drink in a very satisfactory manner, the weak and strong alike. They all have to wait their turn. The first cow will commence drinking and the first two or three will take up the entire quantity of water poured into the trough, and when they get through it will run down further, and I water the entire row of cattle without running out as much as a pailful at the other end at the time they get through. The water is clean and nice, and it is warmed in the tank before it comes in so we have no trouble with freezing pipes.

H. C. THOM—A barn 40 feet wide and 60 feet long will accommodate 20 cows; if you give the cows a space 16 feet by three feet each side, there is plenty of room for the cows; they can lie down and can lick themselves at pleasure, and I believe the time is soon coming when the dairymen of the state will adopt that method.

C. P. GOODRICH—What kind of a time would you have when you wanted to milk?

H. C. THOM—I would have the head of this platform a stanchion and would put them in that and milk them, and would turn them loose after that.

MANURE.

By H. C. THOM, Dairy and Food Commissioner.

Economy.

I won't talk on the subject of manure from the standpoint of a man who has a hundred cows. I will talk about where a man has a dozen or fifteen cows. I will start with a proposition that will meet with objection. I deprecate the practice of throwing out manure every day. I don't believe when you take out manure every day where bedding is used liberally that you get the greatest advantage from that manure. I think that manure to give the soil the greatest benefit should be thoroughly rotted. There is nothing in straw when it goes on to the field in an unrotted state that will give the soil much strength, but if you take straw from the stack and so handle it that it becomes thoroughly rotted it is of great advantage to the soil. Now, my idea in speaking of cows running loose was that the stable should not be cleaned from the time the cows go in to the stable in the winter until they come out in the spring. That may be opposed to your ideas of cleanliness but your ideas are wrong about that. With a fair use of land plaster as an absorbent, you can keep the stable just as free from bad odors as this room is at present. I have done that now for a number of winters. I wouldn't use lime for the reason, as has been stated, it is a dissipator of ammonia, and ammonia is a fertilizer, and if you disengage the ammonia you are losing fertilization.

No Waste.

Now, if these stables are liberally bedded, you will accumulate in six months, from two and one-half to three feet of manure, and it can be taken out after the crop is cut and distributed where it should be distributed, upon the grass land, and it is in the best possible condition and you have saved every ounce of liquid and you have saved every pound of solids. There is nothing that has escaped; you have got it all.

Now, I have two barns, one 40×60 and the other 24×48, in which cattle run all the season through, and when that manure is taken out and put upon grass land upon half of a field, you can tell that grass land just as far as you can see it the next year. The idea of putting manure in heaps belongs to the dark ages. The idea of putting it in a yard and letting it spread all over a yard is not economical. But if manure is taken into a yard and there is something of a hollow in the yard, or better still a hole made on purpose, and the manure is put into that and so handled that it does not fire-fang, I believe that but very little of its value has been lost.

Fertility is Wealth.

Every one knows that the Germans are especially noted for their economy in the handling of manure. One of our most successful farmers, Mr. Linse, of La Crosse, has a hole or pit dug in his yard, and it is stoned up and grouted on the bottom, and in the bottom is a round hole with a grating over it. The top of it comes up four feet above the surface and he drives right to it, and all the manure from his barn is put in there, and there is a cover over it, and when he comes to draw it out, he drives his team right in there and loads from the side. He puts a pump down into the hole below the grating and pumps up the liquid, and he has a long, tin spout which he can swing around, and he covers the top of the pile with the liquid that comes from the bottom; and Mr. Linse's success in fertilizing his farm has become a matter of comment all over the State of Wisconsin.

There are many farmers in this state who have straw stacks; some are burned; they are considered of no commercial value. If they are correctly handled and turned over two or three times in such a manner as to wet down, you will find you will get a body of pretty fair manure out of it.

Mr. J. M. Smith, of Green Bay, who has produced the richest forty acres of land in Wisconsin, never thinks of distributing manure directly upon land, but places it in compost heaps and it is turned over and handled and at last carried out on to the ground, and I believe that in this respect we can economize in the management of the farm.

DISCUSSION.

L. C. ADAMS—Does fermentation in manure increase the value of it?

MR. THOM—It does not.

GEO. MCKERROW—Which are the more valuable, the liquids or the solids in the manure?

MR. THOM—It is conceded by nearly every one that the liquids are.

GEO. WYLIE—What per cent. is lost by piling manure in heaps?

MR. THOM—I think it is a very small percentage that is lost.

GEO. WYLIE—In heaps in the fields I mean?

MR. THOM—It would be a dead loss to me; I have tried it several times.

THOS. CONVEY—Does the storing of manure in large heaps cause fermentation?

MR. THOM—Yes.

THOS. CONVEY—And you say fermentation does not increase the value?

MR. THOM—Yes, sir.

THOS. Convey—You store manure in sheds, do you?

MR. THOM—Yes, sir, I do.

THOS. CONVEY—Do those statements agree?

MR. THOM—They do in practice; they may not in close theory.

THOS. CONVEY—Do you favor the use of land plaster?

MR. THOM—I do.

THOS. CONVEY—Does it have an equal effect on all kinds of soil?

MR. THOM—I think not; I am talking about it in reference to the manure and not the soil.

JOHN MARCH—Do you have a stairway for your cows to get in and out of your stable?

MR. THOM—It doesn't take very much of a stairway for the cows to get up or down three feet. An old German up to Kewaunee says, It's all bosh. I said, Have you tried it? No, he said, if you let your cows run in there all winter by spring they will be way up by the ridgepole. But it is not true. My cows have never accumulated over three feet in a winter.

J. M. TRUE—Do you understand there is always an escape of ammonia when there is fermentation in a manure pile?

MR. THOM—No, sir, I do not.

GEO. MCKERROW—If you have grass

land to put this manure on wherein is the loss in hauling it out every day?

Mr. Thom — Well, my experience has been in putting it on meadows, that I have got a combination in the next cutting that is not very desirable; there is a large amount of straw in it.

Geo. McKerrow — What objection is there to it on pastures?

Mr. Thom — Coarse manure cannot be distributed without loss to the pasture, it destroys some of the grass.

Gov. Hoard — Can you manure a pasture without having it offensive to the cattle?

Mr. Thom — No, sir; but two or three rains will remove that.

C. P. Goodrich — Now, I want to know when and under what conditions you would apply manure to the land?

Mr. Thom — After it was rotted I would put it on the meadow after hay cutting; I would never think of putting manure on ground and plowing it under.

C. I. Brigham — Do you have to bed your cattle every day?

Mr. Thom — Not always; if the cattle are bedded every other day it is sufficient. A creature running in that manner never lies down on the same droppings twice.

C. I. Brigham — Do you feed in mangers?

Mr. Thom — I do.

C. I. Brigham — How do you arrange your mangers so your cattle can eat out of them towards spring?

Mr. Thom—There is no floor in the barn; this is the feeding floor, and the bottom of the manger is right here, about three feet high; then I run two by fours and fasten them up at the top, and then across here I put another two by four this way so, that leaves a square hole for every animal to put its head in and eat from the manger which is on a level with the feeding floor, and in the spring, if there is three feet of manure in the stable, the cattle can still easily eat from the manger.

Mr. Dowling—I have been compelled to use an absorbent behind my cows which has been rather costly to me—it was burned clover.

R. W. Dennis—What is the value per cow of the liquid droppings for a year?

Mr. Thom—If you will consider the whole manure worth $10, I should say that the liquid manure would equal about six of it.

C. I. Brigham—What is the value of manure from one cow through the year, as you operate them?

Mr. Thom—A ton of manure on land worth $100 an acre should be worth $2; if it is on land worth $10 an acre it is not worth so much.

Orange Judd—I have seen this practice of not removing the manure from the building until spring in western New York with large herds of sheep, where the manure has been left until it raised to four or five feet in height, in a large ground cellar. But I do not think it is a good practice generally where we have not plenty of bedding.

I want to say a word in regard to the use of absorbents and ammonia. I was very strongly of Gov. Hoard's opinion and theory after I had spent three years in a laboratory, but I have changed my opinion a good deal since, and I think the experience of those who have tested it has changed. We may get a little smell of ammonia from the manure, but there is not much ammonia there. The escape of ammonia does not amount to so much after all. No appreciable amount of ammonia will escape so long as moisture is present; if the manure is kept damp not enough ammonia to amount to anything will be lost.

Gov. **HOARD**—Where does it go when it fire-fangs?

ORANGE JUDD—Fire-fanging is lack of moisture. Land plaster is very good in certain places, but until we know by experiment where it is good, it is not really well to buy it.

Gov. **HOARD**—Do you mean to use on land?

ORANGE JUDD—Yes. It is not worth its expense as an absorbent; I am quite sure of that. Soil is much better. I have carried on some experiments in that line. We want plaster on some of our soils, but it is far too expensive to use as an ordinary absorbent.

J. M. **TRUE**—Don't you believe that land plaster has a tendency to fix the ammonia in the manure?

ORANGE JUDD—Not so much as supposed. There isn't a great deal of interchange of elements in changing the sulphate of lime into the sulphate of ammonia. Under proper conditions of heat, etc., there may be—in a laboratory for instance. I rather object to the governor's theory, except where you want the land plaster on the land. As a general observation, the plaster is far too expensive where it is not wanted outside of the manure. Simply dry earth, rotted manure or burnt clover, or any material that you can throw in will do very well.

Gov. **HOARD**—We have got to be very careful in our experience meetings. We must not pound one another over the head because our experiences differ. I have been making some experiments in regard to the fertilizing values of manure from the use of land plaster. I will give you one. I took seventy rods of ground, and used a barrel of land plaster, and with those cattle it amounted to sixteen loads of manure; the ground was so poor that it would hardly produce a crop of potatoes. The land was planted to corn and the manure was put in there green. The land was planted and the manure was put on and dragged under. There was a barrel of land plaster in this manure. The corn was planted the 9th day of May that very dry severe season we had. The corn seemed to find sufficient land fat in that green manure so that it never stopped growing a moment, and I had stalks in sixty days' time that weighed ten tons, cut even with the ground. I cut on that piece of ground, four tons 170 pounds of cured corn fodder, cut on the 15th day of August and weighed the 15th of November. On a corresponding piece of ground with manure that had no land plaster in it I had a most signal failure. Now, if with the same season, and the same quality of manure and the same quality of solid and the same kind of crop, I produced those diverse results, it was to me a very significant experience.

SUPT. MORRISON—The question of "watering" will now be taken up by Mr. T. J. Fleming, of Watertown.

MR. FLEMING—We will consider the subject open for discussion at once. Are there any questions?

H. C. **THOM**—Would you heat water above 70 for cattle?

MR. FLEMING—In winter I would heat it higher if I had the facilities for heating.

C. P. **GOODRICH**—If you could give cows water fresh from the well at, say 48 degrees, would you think it would pay to heat water?

MR. FLEMING—I don't *think* it would pay; I know it does from my own experience.

GEO. MCKERROW—If they could drink

this water at 48 degrees in the stable, don't you think it would be better than to have them drink it out doors?

MR. FLEMING — I don't think the advantage, if there is any, derived from watering stock in the stable will pay for the extra expense; heat the water outside and let your stock go and drink it.

C. I. BRIGHAM — How are you going to heat water for a herd of forty cattle?

MR. FLEMING — Go to the necessary expense of putting in heat.

C. I. BRIGHAM — How much would it take?

MR. FLEMING—It differs; I can't tell you how much a water tank costs; after making cheese I turn the steam in the boiler of my engine into the water tank, which gives me the necessary heat. But if I had to put in the necessaries for heating water I would be willing to do so.

C. I. BRIGHAM—What would be the profit in one season of heating water?

GOV. HOARD—It would cost you about $50 for good apparatus and about five cents per day for soft coal.

MR. FLEMING—I have had but a crude way of experimenting with this question. Up to three years ago I always watered my cows with the cold water as it came from the well. When I got to dairying as I thought I should I began to heat the water to a temperature of ninety degrees and found that the cows yielded very nearly twenty per cent. more when receiving this warm water than when receiving the cold water, all other things being equal. I attributed this to the warming of the water and to the facts that the cows drank more of it.

SUPT. MORRISON—Would you advise offering cows water more than once a day?

MR. FLEMING—Had I the facilities without incurring extra expense I should water my cows twice a day in winter, but I am obliged to water them only once.

MR. RUNDLE—What is a usual and cheap method of heating water?

H. C. THOM—I have an ordinary cast-iron heater, running into the side of a 25 barrel tank; it costs I think eleven or twelve dollars. I use in that heater such drift stuff as may be found about the farm, sometimes cobs, sometimes short pieces of roots and soft coal, soft coal is the safest on account of sparks.

L. C. ADAMS—Do you think it profitable, Mr. Fleming, to warm water for animals fed for beef purposes?

MR. FLEMING—I have never fed any beef cattle and I don't think I am prepared to answer that question intelligently.

SUPT. MORRISON—Does the purity of the water have any influence on the quality of the milk?

MR. FLEMING—I believe the purity of the water from the milk standard is one of the most important elements which enters into the production of milk. If we look at the office of water in the manufacture of milk we come to the conclusion readily, that water is one of the leading constituents. The water drank goes directly into the blood. It is from the blood the milk is manufactured or elaborated. We find that the blood which circulates in the mammary glands of a milch cow is almost like milk itself. In good milk we find that 87 per cent. of it is water. When water constitutes so large a per cent. of the milk, it is impossible to say that a cow may partake of impure water, and yet say that the milk can be pure?

H. C. THOM—Cows will drink impure water rather than fresh.

MR. FLEMING—That may be due to some disarrangement of the animal system.

GOV. HOARD—Isn't it due to the temperature?

MR. FLEMING—I don't think it is always the temperature. We have sometimes seen brood sows consume the after-birth. I believe there is some disarrangement of the system which induces them to do so and I believe it is equally so with cows. I don't think it is worthy of consideration why it should be so. We should say, it will not be so. We should not let our intelligence be over-balanced by the instinct of the animal. It is not good for us to drink impure water; and what is not good for us is not good for the cow, as I believe.

MR. HURD—Can the gentleman get any more cheese by using warm water than he can by using cold?

MR. FLEMING—I get an increase in the flow of milk, and I find that the milk is proportionately richer, and consequently I have a profit at the cheese vat as well as at the milk pail.

H. C. ADAMS—Does the quantity of food consumed by a cow bear any relation to the amount of water she drinks?

MR. FLEMING—It does bear a relation to the amount of water, especially as regards the amouut of moisture in that food; if a cow is kept upon dry forage she will drink considerably more water than upon a greener or more succulent food. A cow is not on full feed unless she gets all the water she wants to drink.

ORANGE JUDD—The governor stated an apparatus for warming the water would cost $50. That would scare the great bulk of farmers from adopting that process.

GOV. HOARD—That would be the outside cost of any process.

ORANGE JUDD—A large tea-kettle fitted with a rubber tube will take off the chill of the water, simply running the tube from the nozzle of the tea-kettle and fastening it to the boiler. I believe very earnestly in this heating of water.

SUPT. MORRISON—I was talking with one of the best dairymen we have Mr. John Gould, and he said that he put into his stable last fall a galvanized iron tank, holding 30 barrels, which cast him $19. He gives his cows water at 50 degrees; there is no warming whatever; it is run through underground pipes from the well, pumped directly from the well and it runs into this tank, they receive the water at the same temperature as the stable.

THOS. CONVEY—Should an animal's preference be taken as a guide to go by in watering cows, that is, as regards warm or cold water?

MR. FLEMING—I think not; you can educate them to drink warm water just as well as cold; I have found as much difficulty in getting my cows to drink cold water in the winter after they have been on warm water, as it was to get them to drink warm water after they had been on cold water.

GOV. HOARD—There is a phase of this question of warming water for milch cows that men do not see, physiologically. There is not a real sensible woman, a mother, in this community but what would say to a mother nursing a baby, drink warm drink; that is the old, substantial judgment of every mother in the world. Every mother will tell you if you drink ice-cold water you dry up your milk. Now this applies to a cow as well as to a woman; the lacteal function is the same. The intelligent human mother drinks warm drink; the unintelligent human father forces a cow to drink cold drink and wants that she should give just as much milk. You are making merchandise out of the mammary function of the cow. It is for your advantage to promote the flow of milk; a chill operates upon the functions of the mammary glands and has a tendency to close them up, and stops the lacteal secretion.

PROF. D. E. GARDNER—Is there a danger of cows getting too much cold water on a summer day?

MR. FLEMING—I think if they are kept from water for a long length of time on a warm day and become heated up above their normal temperature there is danger.

H. ROBBINS—Would you give a cow free access to cold water out of a tank after calving?

MR. FLEMING—I wouldn't give a cow free access to water until two or three days after calving.

R. W. DENNIS—Would you give them more water after calving than before?

MR. FLEMING—I would give them drink sparingly.

CARE OF THE COW AT THE TIME AND AFTER CALVING.

SUPT. MORRISON—In the absence of Mr. H. C. Adams, to whom this subject was assigned, Mr. C. P. Goodrich, of Ft. Atkinson, will introduce the topic.

MR. GOODRICH—I suppose it is expected that I shall stand up here and you ask me some questions and see if you can't get a little out of my brain that will do you some good. If you can you are welcome to it; I haven't got but little out of it myself that has been any good to me.

C. I. BRIGHAM—How soon after calving do you consider it necessary to milk a cow dry?

MR. GOODRICH—I generally milk her partially dry as soon as I find her, but not entirely so.

C. I. BRIGHAM—Is is good to feed the milk to the cow?

MR. GOODRICH—I really can't say whether it is or not; I have tried it and the cow did well; I have withheld it and the cow did well.

WELDON VAN KIRK—I would like to ask Mr. Goodrich his idea of the cause of the retention of the after-birth?

MR. GOODRICH—I haven't had a case of that kind for I think five years. I take good care of my cows and feed them well and they are not troubled that way.

GEO. MCKERROW—Do you feed your cows heavily, for a month before calving. we will say?

MR. GOODRICH—I do not; I feed them but very little corn.

J. M. TRUE—What is the special character of the feed that you feed for the last month before calving?

MR. GOODRICH—I feed good hay and good corn fodder, and feed ensilage now; and the grain part of it would be oats and bran, but not corn meal.

H. C. THOM—Do you think that is an infallible recipe for getting rid of the after-birth?

MR. GOODRICH—That wasn't a recipe for that at all, but I think good keeping helps.

J. M. TRUE—Don't you think there is

a good deal in the character of the feed that is fed during the last few weeks in its effect upon the retention of the after-birth?

MR. GOODRICH—I don't know.

GOV. HOARD—Don't you think that a feverish condition of the cow tends to the retention of the after-birth?

MR. GOODRICH—As I said to start with, I haven't had much experience with that trouble, but I used to, years ago when I didn't take so good care of my cows as I do now; they were exposed to storms, and drank ice water, and, on the whole, were not very well taken care of, and I occasionally had such a case then.

GOV. HOARD—Do you know whether it is frequent or not for cows when on pasture to have a retention of the after-birth?

MR. GOODRICH—I don't think it is very common.

GOV. HOARD—Is it as common as when fed on winter feed?

MR. GOODRICH—The cases that I used to have were in the spring, in March and April, when they were fed on dry feed.

MR. SLOAN—When should you take the calf from the cow?

MR. GOODRICH—I think it is best to let the calf run with the cow and suck the cow for two or three days, until the milk is good, for the reason that I think the other course is more likely to produce milk fever.

MR. SLOAN—You don't milk the cow dry the first time then in order to prevent milk fever?

MR. GOODRICH—That is an idea that I have, that they are not as likely to have milk fever if the cow isn't milked perfectly dry; it may be wrong.

R. W. DENNIS—What is the simplest preventive of milk fever? And also you said you fed your cows on bran and oats; do they give a good, rich, heavy cream when you feed them on oats and bran?

MR. GOODRICH — What I said as to oats and bran was before calving, but I will say that they will give just as rich milk fed on bran and oats, as on corn meal.

R. W. DENNIS—I have been feeding about a half dozen cows this winter, on clover hay and bran and oats in equal proportion to the clover they were fed, and the complaint was that there was no cream on the milk all winter. I had a quantity of fox-tail in my oats a number of years ago and I screened it out and fed it with oats to my cows, and when I fed that we got heavy cream; but after that when the cows were fed bran with oats they gave but little cream.

MR. GOODRICH—I think I can see the cause why a great many fail in feeding bran. It is light stuff, and they have been feeding heavier feed; they will have oats and corn ground together and feed a panful; but a panful of bran isn't worth as much; if you will feed just as much in weight of it you will have better success.

R. W. DENNIS—When I was feeding the fox-tail I used a third of the fox-tail and two-thirds of oats.

GOV. HOARD—What do you mean by fox-tail?

R. W. DENNIS—It is a kind of stuff that grows all over this part of the country, in the oats particularly, and very often in the corn, if it is neglected.

SUPT. MORRISON—As a general thing the poorer the farmer the more fox-tail you will find?

R. W. DENNIS—Yes.

MR. GOODRICH—I can give you a sure preventive of milk fever; you can starve it out of them. You starve a cow a month and she will never have any milk fever, but if a cow is a good cow and well taken care of I don't know of any sure preventive. I have had several cases of milk fever. The first two cases I had, the cows died; the next one the cow was ruined; since then I have not lost any. I use aconite, twenty drops, of the strength made to use with animals. It is tincture of aconite such as they sell for stock.

MR. HENDERSHOT—Do you think it is injurious to a cow to eat her after-birth after calving?

MR. GOODRICH—Where she has an opportunity to do it I allow her to do it, if she wants to, and I don't know of any hurt it does.

T. J. FLEMING—Don't you think it will make the cow sick?

MR. GOODRICH—I have never known it to.

JNO. MARCH—What is the best treatment for a caked udder?

MR. GOODRICH—Well, I don't know of anything you can do for it only to feed the cow very lightly, and keep the milk out of it.

GEO. MCKERROW—Is there any ointment in use that is good for that?

MR. GOODRICH — I never have used any; I presume there is.

MR. SLOAN—I had a cow with a caked bag and I made a liniment of glycerine and —— in equal parts, and rubbed it on externally.

T. J. FLEMING—I have a simple and effective remedy for caked udder. I use 20 drops of tincture of aconite, putting it on an ear of corn, which is the best way to get the cow to eat it; then I take about a half bushel of bran and put it into an old horse blanket and steam it and then wrap it around the cow's udder, over the abdomen and across the loins; I don't know as that has any effect any more than retaining the heat, but that has a tendency to extract the inflamation; three doses of aconite, with this treatment, has invariably succeeded with me; I wouldn't give the doses nearer than an hour and a half apart.

SUPT. MORRISON—We have had discussions all over the state in reference to the retention of the after-birth, and a great many cures have been brought out. The most reasonable one I have heard was from an old dairyman the other day. He said sometimes this after-birth was retained and had to be taken away, and he had to send for a veterinary surgeon. He said if it ran above a day he gave a fluid ounce of ergot in a quart of warm water and that he followed with glauber salts, and then about an hour after he would give about one pailful of warm water, and a tablespoonful of ginger stirred in with about a quart of middlings or bran; since he commenced that system of feeding the cow he had never had a case where the after-birth was retained.

MR. PERRY—If you feed cows oats, the same as you do horses, for two or three weeks before they are expected to come in, the after-birth will not be retained. In some cases it is pretty difficult to discharge the after-birth when it is retained.

J. M. TRUE—The point made by the gentleman is a good one. The subject of prevention is a much more important one than how we may cure anything that is established in the shape of disease. I think the question of feeding in its relation to the retention of the after-birth is one that should be carefully considered.

H. C. THOM—I don't believe that any feed fed to the cow is an infallible recipe for getting rid of this after-birth. Every man who has got five or ten cows meets with this difficulty every year almost. I believe it is the worst policy to allow an after-birth to follow the calf by more than twelve hours. I don't think the milk is fit to use for a long time, if retained longer than that. If you feed your cows in the most intelligent way yet you will have cases of the retention of after-birth. I have seen cows as fat as hogs and as well kept as could be and that still retained the after-birth; I have seen them in medium condition and still retain it. The best dairymen in the state have experience with it. It is a physical matter; the after-birth is retained by tissue. There are buttons fastened into these little pockets and they are fastened with this tissue, and I don't believe ergot will take it off. I believe a cow will contract the habit of retaining the after-birth. It runs in a family, like a wooden leg sometimes.

J. M. TRUE—Would you keep a cow that had the habit of retaining the after-birth?

H. C. THOM—No longer than I was obliged to.

THOS. CONVEY—Don't you think feeding on oats, a laxative feed, will tend to prevent the retention of after-birth?

H. C. THOM—Yes, I think that is true, but I don't think it is well to lay it down as being an infallible recipe for it. If a man will oil his hand or wet it and go to the back part of the cow and insert his hand he will find this after-birth fastened to the uterus of the cow, and he can tell, if he is at all delicate of touch, whether it is tearing or coming off naturally; it will drop away. If a cow retains her after-birth three or four days it will take her three or four months to get her milk back into good condition.

FALLACIES IN BREEDING.

By GEORGE W. WYLIE, Leeds.

In the limited time at my disposal it is impossible to even briefly allude to the many fallacious ideas connected with the breeding of our domestic animals. Such ideas as, controlling sex, the influence of first impregnation, effect of imagination upon the color, aged sires bred to young dams, and young sires to aged dams.

The outward confirmation of the sire and the constitution and disposition of the dam being imparted to the progeny, and many others that might be mentioned, are conceded by careful, intelligent observers and practical breeders to be largely fallacious. But the particular fallacy that I wish to allude to at the present is that of breeding in and in.

Breeding In and In.

Incestuous breeding at the present time is an entirely different thing from what it was in the days of the early improvers. They bred in and in to fix a type and from animals of no previous affinity, while to-day we are using animals of the same general type and full of the same blood to begin with. That the early improvers by breeding in and in took the quickest possible method of fixing types, and establishing breeds is probabably true. That by persistent selection without inbreeding the same results might have been accomplished, is just as true, but it would have taken longer time. The early improvers considered inbreeding and the keeping within certain prescribed limits of blood necessary to fix a type or establish a breed. But when representatives of a breed have become so numerous that there are different families and branches of families, strains and sub-strains, all belonging to one breed, the necessity for inbreeding with that particular breed would seem to have ceased to exist. If all the excellence of any one breed were wrapped up in one family or strain, then perhaps, the necessity for inbreeding might for a time exist. But this, I believe, is not the case with the large majority of the breeds with which we have to deal to-day.

And any method of breeding that tends toward a weakening of the constitution, the transmission of disease, infertility and barrenness, must be considered dangerous. An animal or a race of animals lacking in constitutional vigor and substance, is like a house whose foundation is on sand. There is perhaps no class of breeders who have had more experience with inbreeding than the breeders of some strains of Shorthorn cattle. For 30 or 40 years past a good number of them have been working with some pet strain of this breed trying to produce something phenomenal by breeding in and in.

Out-Crosses Preferable.

While these men have been working in this way, Amos Cruickshank, over on the bleak hillsides of Scotland, by a judicious system of out-crosses, with only individual merit backed by a good pedigree to guide him, has produced a family of Shorthorns of such excellence individuality, constitution, and substance, that in comparison the inbred weaklings on this side almost look as belonging to a different breed.

When Gen. Sherman struck out on his famous march to the sea, he made a departure hitherto unknown in modern warfare; and when Amos Cruickshank left the beaten path before pursued, he demonstrated to the world that inbreeding to obtain individual excellence is a fallacy as far as Shorthorn cattle are concerned.

The result has been that there are no better selling cattle among Shorthorns at the present time than the Cruickshank's, and that there are fewer advocates of inbreeding in the Shorthorn camp today than ever before.

There is perhaps no stronger argument against incestuous breeding than that found in the thoroughbred or running horse. He has been bred as a distinct breed for over 150 years and inbreeding in his case has always been strongly opposed as it was found whenever tried to weaken his constitution and impair his staying qualities. Here we have the purest, the most prepotent, impressive and distinct race of all our domestic animals brought to this present high state of perfection without inbreeding in any form. And today he is superior to all other breeds in speed and endurance.

A Model Breeder.

The man who above all others is held up as a teacher to be followed by advocates of inbreeding is Thos. Bates. But any one who will study the career of Mr. Bates as a breeder will find that he was not strongly in favor of in and in breeding, but was compelled to practice it in the early part of his career from the force of circumstances—as at that time, no where outside of his own herd could he find animals of sufficient merit, and of the type wanted to infuse fresh blood into his stock. But when this method of breeding had been carried to such an extent that in a single season 28 of the calves died, supposedly from a lack of constitutional vigor, Mr. Bates made a radical change in his operations. He abandoned inbreeding and never returned to it. And it was not until he had done this that he began to win fame in the show yards of England.

Any one who will carefully analyze the life work of Thos. Bates, will discover that any arguments that may be drawn from his operations in favor of inbreeding are not particularly convincing.

Theory Instead of Practice.

At the present time we have three classes of men who advocate inbreeding. The first class that I will allude to are theorists without much of any practical experience in this particular line, they have what they know on this subject largely from books. And while I do not wish to be considered as questioning the value of information derived from books, it must, however, be conceded that as regards this subject some practical experience is necessary to a thorough understanding of the situation. These men can work no great amount of damage to any live stock industry, except so far as they may from the plausibility of their theories be able to impress upon some new beginner the necessity of inbreeding.

Breeding Trotting Horses.

The second class may be found in the ranks of those who are breeding the American trotting horse. With this class a few fast fliers have been produced in about the proportion of one success in one hundred failures, but the breeding methods practiced by trotting horse breeders are mainly of a different character from that practiced by incestuous breeders among cattle, for instance some of the sons and daughters of Rysdick's Hambletonian have been "out" for two or three generations and then the streams are brought together after being diluted with a large proportion of other blood; in very few cases have the extremely close methods advocated by some cattle breeders been resorted to in the trotting horse thus far. But this breed at present is largely formative and it is, perhaps, too early to draw conclusions; if inbreeding is justifiable anywhere at the present time it is so with the American trotting horse. The third and last class that I will mention may be found among breeders of dairy cattle, some of whom are strong advocates of inbreeding, and their teachings, if adopted by the masses are positively dangerous. I have already said that constitution is of the first importance, the dairy cow may be an exception to this, but as far as my personal observation and experience goes she is the animal above all others that should from the nature of the demands made, have a robust constitution. The breeding of sire to daughter may be the best possible methods to fix a dairy type; but if that method increases the dairy qualities and weakens the constitution what have you gained. If it were possible by inbreeding to increase the dairy qualities and at the same time increase the constitution to enable the animal to back up those qualities, there would be some reason for this kind of breeding. In these days of high pressure and push dairy animals must have constitution, and if there is any one principle of breeding that has been clearly demonstrated it is that increased constitution in any race of animals is not obtained by breeding in and in.

Lessen Constitution.

Some of the most cautious advocates of inbreeding advise that if two animals have strong constitutions no harm can come from breeding them together. Yet they admit that to do so will lessen constitution, but add quality to the progeny. Quality today is not so scarce an article as formerly, and experience would seem to teach that it would be much safer to hold on to what constitution we may have, and reach out and add the necessary quality by the infusion of fresh unrelated blood of equal or if possible greater merit. The advice of advocates of incestuous breeding is farther reaching in its effects than most of them appear to think. Questioned closely they usually admit that not one man in fifty has the necessary qualifications to make it a success. But the economical side of the question is quickly grasped by the masses, and men who may be owners of but one pure bred animal will conclude that they possess the requirements of that one man in fifty and will practice incestuous breeding accordingly.

Look Forward.

Advocates of this kind of breeding are always looking backward and pointing to the success of our fathers and grandfathers in this field. But conditions are entirely different today, and different conditions require different methods. Our fathers may have been good farmers but it is generally conceded that improved methods in their day would hardly be successful now. How much less then is the breeding methods of our grandfathers applicable to the changed conditions of the present time. "The world moves," no one man or set of men have a monopoly of the best animals o· strains in any of our improved breeds. The necessity for inbreeding has ceased to exist, and the breeder who seeks first constitution in the animals he breeds, will have all other things added unto him.

PRINCIPLES OF BREEDING.

By Gov. W. D. HOAR-·.

Mr. Chairman and Gentlemen: I think every farmer will admit with me that it would be an advantage to him if he was a good student of the principles of breeding our domestic animals. Now, we have, for instance, too low an average of domestic animals in this state. To what does this trace? In my opinion it traces to the lack of intelligent study on the part of the average farmer in producing a good animal. Breeding is the foundation; feeding is the finish. We have, for instance, so poor a lot of cows in this state that they do not average 125 pounds of butter apiece for the year. Yet Mr. Goodrich has a herd of cows that average over 300 pounds. How did he bring his herd of cows to that average? They produced one year 357 pounds of butter apiece. How did he get them to do this? Why, he started right. He commenced by laying the foundation of a butter cow. How? By better breeding, by being intelligent in the use of principles that lie at the bottom of all butter breeding.

Principles are the tools of the breeder. He must understand how to use them. In order to acquire understanding he must study, not only the work as it lies in his own hands but the work and experience of others.

Application of Principles.

Another man has a sheep and the carcass of that sheep would weigh say 70 pounds. I saw a lamb in Canada two years ago eight weeks old that weighed 70 pounds. What is the difference between the two animals? One is a product of intelligence in breeding and treatment, and the other a product of a lack of intelligence. Now, we have a low average of beef cattle, of dairy cattle, and of mutton sheep. We have a better grade in hogs than in anything else. One reason for that is that there is no other use that you can make of a hog except to kill him. Greeley said the poorest use you could make of a man was to hang him, but the best use you can make of a hog is to kill him. No one ever heard of a general purpose hog, except down in North Carolina. There they produce a hog that I know from experience will outrun a horse. I have run a horse after them, and the hog would always keep a good healthy distance of fresh air between himself and the horse, until he got tired and then he would dart into the woods out of the way of pursuit. A man once went to North Carolina with a lot of Berkshire hogs to exhibit them at the state fair. He noticed that everybody was passing by and looking at the razor-back hogs. He said to a North Carolina farmer, "What is the matter with the people? You don't seem to look at my hogs at all." "Well I reckon not, sir," said the North Carolina man. "What is the reason; don't you want this kind of hogs down here?" "Well I reckon not, sir." "Why?" "Well we'uns want a kind of hog that will outrun a nigger." If they don't outrun the negro the man don't own the hog you know.

With all our farm amimals there is a serious lack of the principles of breeding. I want to call your attention to some of the facts that show that very plainly. The trotting horse men do not lack in a study of how to produce a trotting horse, nor the draft horse men in the study of how to produce a draft horse; neither does the bird-dog breeder, or the fox hound breeder, lack in study. Why? Because they hold steadily to the principles that are in line with the animal's function. No fox hound breeder mixes up his breed; he never goes to crossing with the mastiff, or the bull-dog, or the shepherd dog, with the idea that he is going to get a good fox hound. Yet, the average farmer in Wisconsin has no other idea to-day but to make hash of his breed. He crosses here and there and everywhere. One man said at an institute, one day, that he had started with Merinoes, and crossed with Cotswolds and then crossed with Oxfordshires and then he crossed with Shropshires, and says he, "My sheep ain't worth anything." I was a good deal struck with the vigor of the man's statement. He says, "They are neither worth anything for wool nor for mutton." That is one conclusion I want to present to you.

The Necessity of Strong Lines in Breeding.

If I want to pull a bell at the top of a building and make it ring, I have a rope. Supposing that rope was made up of a strong piece of rope one foot long, a rotten piece of cordage another foot and the line up to the bell was broken in two and simply tied together so as to barely hang together, and that there was no straight, strong rope clear to the bell—I couldn't ring the bell, because if I laid hold of it vigorously I would break the rope. I couldn't pull, for the result that lies way back at the end of the rope. That illustrates line breeding. What is needed in Wisconsin to-day, is for farmers to begin to study more particularly into the value of line breeding, breeding in line for what we need, and not break up that line by foolish crosses; we make hash if we do. You cannot make chopped straw into a good strong band. Chopping up breeds produces the same result.

Pre-potency.

What is breeding based on? It is based on heredity. We use another word, potency or pre-potency. Mr. Wylie spoke of inbreeding as establishing potency. The Jew is the most wonderfully in-bred man of all men on earth. He has been in-bred from the very day he left the Egyptians. You may breed him with any race on earth, cross him with any woman in the world and the child will be a Jew, more than anything else. Now those are principles that apply right here, just the same with animals as with men. What is the reason of that? Because the Jew has established a type so potently and powerfully that the moment the current of his blood strikes the current of her blood the Jew current takes possession of the other, and the result is a Jew. Now, that is a valuable thing to study on; that is the meaning of pedigree. Some men sneer at pedigree, and say that it is worth nothing. Pedigree has a long number of agreeing bloods behind it in line. Men need not only a good specimen of the individual animal but they need a long line of fathers and mothers of the same line of characteristics, so that there is a constant agreement and augmentation and enlargement of the functions for which the breeding is done.

Power of Assimilation.

It is a well known fact today that if a Texas steer is given a quarter of a bushel of corn meal as his ration, and you take a Shorthorn steer and feed him the same quantity, and you will get very different results. Why? Because the power to assimilate food and produce meat has been bred into the Shorthorn and by a constant, slow process built up. The Texas steer has never been bred for anything except to get over the ground, and I know from experience that he can do that. I once had three hundred of them chase me two miles across a prairie, and if a man is to be judged by the enthusiasm of his following, I was the most popular man ever seen in Texas.

Now, there are certain principles that I want to bring out in order to show that the farmer needs to study them. Why? Because his money and his living and his profit are in these animals, and yet he seems to think that nobody but the breeder ought to study breeding. Why, the farmer is the man that is to make the money out of the farm in Grant county. It is the average farmer that has to produce the animals of the county, not the breeder. Therefore, the average farmer should be just as wise in producing a good animal as the breeder. He should be a breeder.

Law of Heredity.

Now, take dogs, for instance. They are a favorite illustration of mine because it is so clear on this question of heredity. Take a setter and a fox hound;

both have noses equally sharp. And yet hundreds of years back wise men began to breed one dog to smell birds alone, and the other to smell four-footed animals alone, and so well have they succeeded that the setter dog is almost oblivious to any other scent but the scent of the bird. You may take him out into the field to hunt birds and he may run across a thousand fox tracks but he does not know it, because he is there to smell birds alone, as the trotter is there to trot and do nothing else but trot; like the mutton sheep which is there to produce mutton and nothing else but mutton, practically. That is the object of his being. A fox hound will cross a thousand bird tracks and he does not know it. It is not for lack of capacity to smell but because his heredity is not in that line. But the moment he strikes the fox-track, *for which he was bred*, for which he was born, that moment he answers quickly; he has found that which he was bred to find.

Now, I want to call attention to foolish policy the farmers of this state pursue. You do not find dog men acting as foolishly as farmers. No boy fifteen years old would ever undertake to go hunting foxes with a bird dog, or birds with a fox hound, or either with a bull-dog. And yet we have thousands and thousands of farmers in this state that are trying to make butter with beef animals and trying to make beef with butter animals. The average production of our cows is a disgrace to Wisconsin intelligence. I tell you, my friends, it is not feeding so much to-day, as it is intelligent shaping of these animals for a purpose.

Breed vs. Feed.

An old man jumped up one day in an institute and says, "You may talk as much as you have a mind to about breed, I say the breed is in the corn crib," one of those truths that are partly true and yet not true. I said, "If your words mean anything at all they mean that you don't pay any attention to breed, but everything to feed." "Yes," he said, "that's right." "Very well," said I, "you are the man I have been hunting for for years. You have got a short cut to success, and I want to get it. It doesn't make any difference what the breed is; it is all in the feed?" "That's it," he said. "Very well," said I, "do you remember that razor-back hog we had here thirty or forty years ago?" "Oh, yes," he said. "Now," I asked, "how would you feed that hog so as to make a Poland China of him?" He looked a little staggered. I added, "How would you feed a race horse to make a draft horse out of it? How would you feed a Jersey cow to make a Hereford out of it?" "Well," he replied, "you may talk as much as you have a mind to, but I believe just what I said." Now don't you see, that too many of us are not teachable. We come together on these questions and every man has his own opinion, and would stick by that notion as he would by his own wife, though some men fail them very easily. Remember that breeding is a matter of principle, it is not a matter of experiment.

The Law of Transmission.

Just the same as we take up arithmetic to day and proceed to do a sum in addition according to principle, and do a sum in multiplication according to principle. You built this town hall here according to the principles of architecture; every single stick has been thought out and a principle applied. So it is with our domestic animals. We will take for instance dairy cattle. Some of the opinions that our farmers have about dairy cattle stand right in the way of their success; for instance, that size is essential in a dairy cow. Now, that is a fallacy. You don't send men to Washington according to their size. You don't believe today that learning goes into a man's head according to his size. If you do you have got some tremendous big fools and some very smart small men to oppose that notion. In the dairy cow you are after a specific exhibition of talent and you need breeding to assist you in that matter. Here is a bale of hay. On one side comes a running horse, on the other side a draft horse, on this side a dairy cow and on that side a beef animal. Now, there is just exactly one kind of feed, yet in one case it produces speed, quick, fast action, in another, slow, strong action, in another it produces butter and in another beef. At another bale is fine wool sheep and mutton sheep. You see the difference in the result. What is it that turns the result off like a switch down these different tracks; what is it that takes the same car and shoots it upon one track or another? It is breed.

A Thoroughbred Sire.

What is breed based upon? Upon function, capacity, talent. How shall we apply it? By a study of the different kinds of those talents, but the principles that govern their reproduction are all alike. Now, one of these disadvantages that we labor under as farmers, is, that we are not sufficiently educated up to the idea of a thoroughbred sire. The thoroughbred sire is a sire that has received like a river a lot of streams from the mountains on either side running into him to swell the potency of his blood, and that all in one line. A thoroughbred sire is so full of prepotency that he impresses himself upon his progeny. For instance, breed a native cow with a thoroughbred Holstein bull; he has had so many years of breeding in a distinct line that he invariably marks the calves black and white. You may examine the progeny of a thoroughbred Holstein bull and I will guarantee that you will not find one calf in a thousand that will not be black and white. What is it that we call "potency?" Why doesn't the native cow have it? Because her heredity is all broken up. She can't impart it. Take a thoroughbred Holstein bull and a thoroughbred Jersey cow and you will find there that potency wars with potency and you will secure a diversity there that you have not seen in one case where the cow was a native and consequently of less potency.

A Dairy Cow.

Suppose we want to produce a dairy cow. Let us start in by taking native cattle and putting a thoroughbred sire at the head, take an Ayrshire or a Holstein. The Shorthorns today in the west are not valuable for the dairy. We have some very fine milch cows among them but let me ask you where you will go in the west for a Shorthorn bull that will throw strongly and prepotently on the side of the dairy? In England you can find them and in the east you can find them. On the Wadsworth estate in the Genessee Valley is a herd of Shorthorns, started over 50 years ago and they have been bred for milk until today the males are potent in that line; they are not as profitable as beef animals, as those bred specially for beef. As the beef potency increases the milk potency decreases.

You want to raise the best kind of a dairy herd. This is what I would do. I would go among the farmers and select the best native cows I could get. I would want them to be of the dairy form, every one of them. If two cows of equal merit were brought to me, and one should give even more milk than the other and yet was of a beefy form, I would not breed to her, because a cow breeds very largely from her blood and not from her udder. Many a beefy cow has been a famous cow but she wouldn't breed that way. Mr. Goodrich had a celebrated Shorthorn grade cow and she had three heifer calves, but none of them were worth anything for the dairy. A good many farmers have the idea that a good cow individually will surely breed that way. She will not always. Many a beef cow gives plenty of milk but hasn't a dairy tendency in her. Take a cow with a breeding tendency towards dairy work. Then I would couple her with a thoroughbred bull. Then I would take her heifer, if it was a good one and of strong constitution, and breed that heifer to her own father. I would determine the constitution a good deal by make-up and by the development of the navel, which I think is the finest test in the world of constitution; the strong muscular condition of the navel. By breeding that heifer to her own father I would get a three-quarter in-bred, say Jersey, or Guernsey or Ayrshire or Holstein. That is as far as I would go with in-breeding. Then I would have so enhanced the potency of the sire's breed in that heifer by that one in-cross as to make her almost as potent for the reproduction of that breed, as though she were a thoroughbred. These are some of the principles that I would use. By this process I have seen herds where the grandmother was a 125 pound cow brought up so that the daughters and grand-daughters made 375 pounds of butter. The difference in feed wasn't so much but the difference in breed was very great.

Constitution.

I will speak about this question of the navel as an indication of constitution. What is constitution? It is not hardiness. You hear men say, I want a hardy cow. They don't want a hardy cow; they want a cow with a good constitution. The cow you want should be a cow that can endure large dairy work—not bear exposure—but take her food and do large work in the dairy line. A cow ought to have constitution, but you don't want the mother to have hardiness like the bullock. There is a most important distinction between hardiness and constitution. Constitution is something that you can't feed into men; neither can you train it into them. How do you get it into them? It is something that his mother gives him—tenacity and vitality of life. As a soldier, I have noticed some clerk from out of a country store go into the ranks alongside of a burly-built fellow; I have seen them start right even on the march together through the swamps, and have seen the big man go down and the delicate game-cock little fellow come up. What caused the difference? I have seen hundreds of such instances, any old soldier has. The difference was in constitution, not in strength but in vitality and endurance. One of them resisted disease and rose quickly from fatigue; the other went down.

An Army Surgeon.

The first I ever saw of this was in watching a regular army surgeon select men for the army. I saw him reject a man of splendid shape. I asked him why he did so and he said: "The man has no constitution." I asked how he determined that? He said: "Look at the navel." I examined. The man had a flabby, irresolute expression of the belly and thin at the navel, and the whole expression of the abdomen indicated weakness. He would break down at the first exposure. I said, "Doctor, how do you explain it?" He answered: "Constitution is something that a man's mother gives him." I want you young men to remember this because it is something which will be of use to you in your study of animals hereafter. Constitution is something that the mother gives. Life is sustained through the umbilical cord. The mother when carrying the fœtus supports the fœtus entirely through that organ. The whole fœtal circulation is there; the combined circulation of the mother and the fœtus is through the navel. Now, if that channel is weak, small or contracted, it necessarily imparts a weak condition of vitality to the fœtus. If it is strong and full, and has a strong expression as you put your hand upon it, it is a clear indication that the mother has imparted a strong constitution to her young. Physicians will tell you that they have noticed when children are born, that where the umbilical cord is weak and small, the child seems to have a low vitality; where it is short, thick and strong, that child comes into the world with a whoop, he is on deck; he is ready for whatever this world has to give him, and he has vitality right through. These are vital facts. I have never laid these facts before a physician in my life that he didn't say, "I see it," and has brought me agreeing and concurrent experiences on the matter. I asked the army surgeon: "Have you ever applied this to animals." He replied, "I have with horses and I never knew it to fail." I then took up the study in cows.

Constitution does not mean talent for beef, or milk; it does not mean anything but ability to bear strain. I took 3,000 different cases and studied every one and in every instance where I have found the navel to have a firm, strong expression I found that to be a strong cow. I have the data of that study to-day. I have not found any exception to it.

If there is anything of value to you in this talk, it is most respectfully and heartily submitted.

DAIRY SESSION.

HOW TO MAKE A DAIRYMAN OUT OF THE AVERAGE FARMER.

By T. J. FLEMING.

The average farmer with his average herd of cows in number and quality, with the average skill and dairy intelligence, and average dairy manufacturing facilities, is a doubtful subject for success, in the opinion of practical dairymen. Yet, from such a combination as this have arisen the exponents of far-famed Wisconsin dairymen. And what has been the system or line of action through which this reputation or success has been attained?

By looking over the fields of labor traveled by them, we will be materially aided in the rather necessary undertaking.

Do we find them beginning dairying by disposing of all the cows on hand and replacing them with thoroughbreds? By no means, they did not begin that way, nor do we find scarcely any of our thoroughly practical and successful dairymen of to-day using that character of cow. What then! surely you can't mean the scrub cow? The term scrub I don't like, and believe it is often misplaced. It should be *native cow* and scrub owner, feeder and handler.

We take an unwarranted stand when we say our cows will not pay their keep, unless we have given them surroundings and treatment under which only they are capable of showing their possibilities.

Better Cows.

And I believe a cow's capacity to produce milk in quality as well as quantity can be developed by food, care and handling, just as the trotter is brought to his greatest capacity to trot, by the judicious manner of feeding, caring, handling and developing. Therefore, fellow farmers, let us not discard our cows on hand, if the treatment of these animals in the past has been of that character not calculated to develop. Nor are we qualified to pass judgment on a cow's possibilities after a week's good treatment, because it takes a longer time to change her from an inferior to a profitable animal. And we should, if she shows any susceptibility of improvement in that time continue in the same direction until we have established her identity for or against profit. And when this is done, let us be as quick to discard, if unprofitable, as to retain if profitable.

Now, my friends, I am morally certain that the percentage of cows in Wisconsin capable of yielding a profit under favorable circumstances, is much larger than estimated and far beyond the actual number paying profit, owing to the injudicious and culpable treatment they are receiving at the hands of their owners. And while I am willing to concede the advantages to be derived from the infusion of better blood into our dairy stock, I do not believe that it is absolutely necessary or the first essential for the average farmer to rush into.

Improve Your Cows.

What then, should he do? Instead of milking his cows about seven months, milk them ten to eleven. Instead of turning cows to pasture May 1st, with the regularity of the change of seasons turn them when the grass has well covered the ground and attained a good height, at which time it is capable of developing permanent and rapid growth. While on the other hand if we turn to pasture while the plants are tender and spindling, having no avenues or channels through which to draw support or plant food, except its slender roots penetrating the cold, wet soil, the pasturing will check this growth by biting short those tender plants, and treading under foot even more than they consume. Bear in mind that there is no known single feed which will put a cow at her best.

Add a Grain Ration.

Even our best pastures in my own experience, can be improved by feeding a grain ration, and now, as grain is so cheap, will we not give it a trial for the purpose of establishing an experiment? Couple with this good feed and plenty of it, free access to good, pure water, and salt, never losing sight of the fact that milk is materially influenced in quality and quantity by the judicious or injudicious use of these two milk producing elements. Then cultivate in your animals the principle of docility by your kindness to them, milk at regular intervals with clean, dry hands, quickly strain and remove milk from contaminating influences, aereate by dipping or pouring while at its normal temperature if intended for butter making, where the centrifugal process of creaming is used, and especially should it be aereated before cooling when intended for cheese-making. But, why confine the treatment to those two systems? Because I believe them to be the only practical and profitable systems for the average farmer to follow.

Winter Food and Care.

A word about winter food and care. This feature of dairying is neglected because we have not brought ourselves to realize the advantages and profits derived therefrom.

We should remember that there is nothing in the organic make-up of a cow, which prevents her from being a profitable milk, butter or cheese producer in winter any more than in summer, if we only give her summer surroundings.

But bear in mind that success can only be attained by the average farmer who puts intelligence, thought, study and 365 days of the year into his business.

DISCUSSION.

L. H. ADAMS—Isn't it a fact that the low yield of milk is the reason there is so little profit found in the milk business?

T. J. FLEMING—It is undoubtedly, and I think the cause of that low yield of milk is largely owing to the poor care given our animals. I would state in corroboration of this, I have what you would call scrubs, natives; four years ago they would produce only 3,000 pounds per cow. I have those identical cows in my herd to-day, with their offspring, of course. The past year, including old cows, some past their eleventh year and others in milk for the first time, and I have, through nothing more than judicious care, treatment and good food, raised the milk producing capacity of those cows to six thousand pounds of milk. Now, I don't bring that up as any reflection on breeds, but simply to show that there is a great deal more in the cows we have upon our farms than is commonly imagined; we have not given them a good trial.

GOV. HOARD—Are you not in danger of leaving clear out of sight the distinctive difference there is in cows; don't you think if you were to take a herd head by head and test each cow, that you would find a great difference in those cows?

T. J. FLEMING—Undoubtedly.

GOV. HOARD—I have found by tests that, in one case, one good cow gave me more clear profit than fifteen scrubs; I was carrying fifteen scrubs to get less profit than I could get from this cow.

T. J. FLEMING—I believe we have arrived at that time when many of us are forced into dairying. Are we going to wait until we can raise a herd of the offspring of thoroughbred animals? We have got to start in with the cows on hand. I believe in putting at the head a registered animal; I don't say that we should raise every calf of his getting either, by any means. I think it is a mistake to select calves simply on the ground of the size of the dam.

GEO WYLIE—Can a man hope to make a successful dairy farmer unless he reads dairy literature?

T. J. FLEMING—I don't think any dairyman can be a successful dairyman who does not read dairy literature, who does not read the experiences of those men who are making dairying a success.

GEO. WHICHER—Is it not a fact that the cow that has the most generous feed will make the most milk?

T. J. FLEMING—The milk of a stripper I know is richer than of the same cow when on a full flow of milk.

GEO. WHICHER—When I speak of their running down in the quantity of milk in consequence of poor feeding, isn't the milk of poorer quality?

T. J. FLEMING—I wouldn't say it was of a poorer quality. If a reduction in the flow of milk is brought about by starving instead of by drying the cow up, then I don't think the milk would be richer.

SUPT. MORRISON—Do you think you can improve the quality of the milk by the feed?

MR. FLEMING—Yes, sir, I do.

GOV. HOARD—Can you make a cow that constitutionally gives poor milk, give good milk by giving good feed?

MR. FLEMING—I can improve upon it.

GOV. HOARD—Every cow is born with her certain limit, a certain limit of percentage of butter fat per hundred pounds of milk. Understand me clearly; one cow is born with a limit of say three per cent. of butter fat as a limit to a hundred pounds of milk; another cow is born with a four per cent. limit; another with a five per cent., and another with a six per cent. limit; that must be true or you would not have these differences in cows. These individual differences in cows are individual differences of limit. A cow that has an undeveloped limit can be developed by feeding; but the cow that has gone to the extent of her limit cannot be made to go a single ounce further; that has been fairly well demonstrated by experience.

QUESTION—Do I understand you that a cow that has a three-pound limit as a net amount of butter fat in a hundred pounds of milk cannot be made to increase that?

GOV. HOARD—If that is her limit.

C. R. BEACH—Can she be starved so she won't give it?

GOV. HOARD—Yes, sir.

C. R. BEACH—When she has been

starved you can turn around and increase it, can't you?

Gov. HOARD—Yes, sir.

QUESTION—How do you know when you have reached the limit?

Gov. HOARD—When you can't get a cow to make any more milk; she grows fat and she won't give you any larger per cent., then you may know you have struck her limit.

T. J. FLEMING—I don't think there are many of our farmers who have been feeding in a way to determine that limit, and that is a point I wish to impress upon you. I do not wish to take issue with Governor Hoard from a theoretical standpoint; but the fact that we have not been feeding in a way to bring our animals up to that limit, is all the more reason why we should attempt to do so hereafter; I think it is worthy the trial of every farmer in this room.

Gov. HOARD—Have you made any experiment, Mr. Fleming, with the solids in the milk of your herd to know whether you have doubled the amount of cheese that they will produce?

T. J. FLEMING—I have; that I know to a certainty.

Gov. HOARD—Have you made up the milk separately?

T. J. FLEMING—In the winter season I have; I have a partition in the vat and make my own milk in one portion, and the other milk in the other portion.

C. P. GOODRICH—You say they can be developed to a certain limit, but the question is, where is that limit; it depends on the age of the cow. A cow at four year old can be made to give more and better milk than at three year old, and at five can be made still better. When do you reach that limit? I think she can be improved until she is eight years old by the right kind of feeding and development and she will continually give richer milk.

H. C. THOM—Do you know that when that cow of yours that gave 375 pounds of butter in a year, that she was giving a larger percentage of butter fat than that same cow when she gave 250 pounds a year?

C. P. GOODRICH—No, I don't think I do.

GEO. WHICHER—I know that if you take a herd of 40 cows and feed them on hay and give them a generous feed of it, and they will make more cheese per pound of milk, they will make a bigger yield than on lighter feed.

L. H. ADAMS—To go back to the question of improving our native cows which we left some time ago. It has occurred to me that the rapidity with which we progress in this direction toward better cows, is limited to a large extent by the cheese makers, and the fact that there is not a proper incentive among cheese makers and farmers who sell milk for cheese purposes toward better methods and better cows.

T. J. FLEMING—There is an incentive, in my opinion, for the milk producer to produce good milk only when he is a patron of a co-operative factory or creamery. It is immaterial which. Although we have not many of these co-operative factories at present, it will be in a short time so that milk will be made up for exactly what it is worth; if there are four per cent. of butter fat in the milk of A's cows and only three per cent. in that of B's cows, they will be paid accordingly.

L. H. ADAMS—Will it take so much preaching then as now to elevate the standard of the cows?

T. J. FLEMING—No, I think not.

Gov. HOARD—I have had some experience with these different kinds of cows.

We made 12,000 tests in our own creamery in one year and I tell you, my friends, there is a vast difference in cows.

We had milk brought there from one herd of cows which yielded only 2.61 pounds of butter fat to a hundred pounds of milk; to be sure the man didn't feed them well, but he corrected their feed afterwards and fed them well, but they were a low order of cows. Now, if there was no difference in cows in constitution there would be no use in breeding; there would be no particular advantage in breeding cows if feeding made everything; but we see that breeding establishes a foundation and by wise feeding we help to enlarge that limit. But I know myself that we have had men bring us milk that contained nearly six pounds of butter fat in one hundred pounds of milk, and we have had other men bring us milk that contained only three. Now, in that case one man's cows were earning nearly or quite double what the other man's cows were earning, and yet the division had to be made on the pound.

T. J. FLEMING—I don't want to be critical, but we all concede that a stripper puts a larger quantity of solids into her milk than when she is in full flow.

GOV. HOARD—Do you mean per day?

T. J. FLEMING—Yes.

GOV. HOARD—No; a cow will give you fifty pounds of milk a day in June and she will give you a pound of butter; she will give you twenty-five pounds of milk in October and a pound of butter; now she does not put any additional richness in that milk, so much as the fact that she has decreased the water; there is a larger percentage of solids in the twenty-five pounds of milk; but there is not a larger amount per day. Suppose Morrison has a cow, Thom has one, you have one and I have one; in June we bring fifty pounds of milk apiece to the factory, and in the fall we bring twenty-five pounds a day; the milk makes in June the same amount of butter that it did in the fall, but the cow secreted no more solids per day than she did in June.

T. J. FLEMING—She did per hundred pounds of milk.

GOV. HOARD—That is true.

ORANGE JUDD—Do I understand Gov. Hoard to say that you get from 100 pounds in October as much butter as you do from 200 pounds in June?

GOV. HOARD—I have known cows that would give just as much butter in October as in June, when they were giving only half as much milk as they were in June.

ORANGE JUDD—Do you get as much butter from 100 pounds of milk in October as you do from 200 pounds in June?

GON. HOARD—Not always; but often we do, in certain herds. Oftentimes you will find a man bringing milk in June that double the amount of milk produces no more butter than half that amount of milk in October.

HOW TO REAR A DAIRY HERD OF COWS.

By C. P. GOODRICH, Fort Atkinson, Wis.

Some General Principles.

"Train up a child in the way he should go," is certainly good advice for the human family. It is just as sound advice to say, "train up a heifer calf in the way she should go when she becomes a cow."

Now if she is intended for a dairy cow she "should go" first, "in the way" of consuming the best milk producing foods, and second, of converting these foods into the largest possible quantity of milk, rich in butter fat—the fat being the chief valuable part of milk. Then feed your calf just such foods in order to train her organs of digestion and assimilation so that when she enters upon the real business of her life, she will be able to convert as much as possible of these foods into rich milk. Feed your calf liberally so as to promote rapid growth and development, but avoid feeding so as to make her excessively fat. For in this there is danger of forming a beef tendency and habit, so that she will even take on the beef form to a certain extent more than she otherwise would, and quite likely divert too much of her food into the wrong channel for a dairyman when she becomes a cow.

I believe if a dairy cow, which had been proved a good one, should from accident or otherwise be dry for several months, and in the time become very fat, her usefulness as a dairy cow would be permanently impaired, the habit of turning her food into fat would be, in a measure, fixed. And further, I believe that this change would extend to her progeny, so that the calves produced after the change would not be as valuable for the dairy as those produced before. If this were not true, how is it that we have such a great variety of types among our domestic animals that are all descended from one source? Food and care make changes and create types; then breeding and feeding perpetuate them.

C. R. Beach once said, "You feed a common cow like a Jersey and you will think you have got a Jersey." And he might have added, you feed a Jersey as you would a beef animal, to produce the most fat, and, though you may not think you have got a Shorthorn, you will turn her somewhat in that direction, or feed and treat her as some men do a scrub, and soon all you will have left of her will be her hide, because she has not been "trained" to stand hard fare and starvation.

A prominent Jersey breeder who, by the way, has as fine a herd of Jerseys as I have ever seen in the state, was one day showing me his cows. There was one which, although she had the Jersey color and markings, had more of the form of a beef animal, and was very fat. He said she was one of the very best bred cows he had, and at one time was excelled by none in butter production; but one year she failed to breed, and the manager of his herd not understanding the situation dried her up. She was nearly a year without giving milk, and in that time laid on a great amount of flesh. She had ever since been nearly worthless as a dairy cow, and he believed that she had permanently changed her form. He still kept her for breeding purposes on account of her pedigree—the blood that was in her—thinking that her progeny would be valuable. In this I fear that he is mistaken, and that her progeny will in a measure partake of her character as it now is. I once had a similar experience. My cow, which was an excellent butter cow, was dry several months, and being well fed in the time, accumulated a great deal of flesh. I supposed that when she came in she would do better than ever on account of the extra flesh. I thought she could draw on it for butter, or, at least not require so much of her food to support her, and could turn more of that into butter. But I was mistaken. She did very poorly that year, and has never yet come up to her old standard.

These are some of the general principles, briefly stated, which from known facts, and my own observation and experience, I believe to be true, and an adherence to which will greatly aid one in rearing a dairy herd.

It must not be inferred that I place a light value on breed, but that I wish to emphasize the fact that feed and care can work changes in any breed; that by these means the common stock of the country can be greatly improved; also that the best breeds can be made to rapidly deteriorate. Because an animal is a registered Jersey or a Guernsey is not proof positive that he or she is a good dairy animal. A poor Jersey cow (and there are such) is worth no more than any other poor cow.

A Poor Man.

At the close of an institute held in Jefferson the last of February, a man said to me: "I have come a long way to attend this institute, hoping to learn something that would help me, but I am disappointed. The talk was good enough, but it takes money to do as they say. Rich men can do it, but I can't. I'm poor." After a little further conversation I learned that his case was like this. He had lately bought an 80-acre farm and was $2,000 in debt on it. His entire stock, besides his team, consisted of 6 young cows and 2 yearling steers. He had enough good hay to keep them through the winter, but no grain that he could spare for them. His cows would come in in the spring. He wished to work into the dairy business as soon as possible, but he positively would not run in debt another dollar. It occurred to me that I could do no better on this occasion than to take up his case and work out the problem for him, and demonstrate how he or any other man similarly situated could in a few years, rear a good dairy herd of cows. My feelings are the more deeply interested in this case, because the time when I was in a like position is not so far in the past, that I have not the most vivid recollection of it.

Demonstration.

First, sell the steers for whatever they will bring. Sell the hay that it would take to keep them till spring. With part of the money buy some feed, equal parts bran and oats. Begin immediately to feed each cow a small ration, say 4 or 5 pounds a day of this, with all the good clover hay they will eat, with cornfodder and straw, if you have it, to make a variety, until four days after they come in. Then gradually increase the grain feed till each cow has 12 pounds a day. The extra amount of milk from feeding the grain will pay more than double price for it. Raise all the heifer calves, and buy enough more to make as many calves as you have cows. Go to some dairyman who has been grading up to Jerseys for some years, and has yet left some—of course the best—of his common cows. Their calves will be half bloods, and he will sell them when he would not sell the higher grades. Such heifer calves from very superior cows can be bought when a few days old for about $3 each. Do this the second year also; after that you will have calves enough of your own. Feed your calves whole milk, 12 to 14 pounds a day, till they are one week old. Then have it part skimmed milk, till when the calf is four weeks old it may be all skimmed milk, about 16 pounds. Have the milk warm to about blood heat. Have some good hay always within their reach and after they are two weeks old, always have a box that they can reach, with bran and oats in it. Feed them no corn meal. While they are having milk it is better, until they are at least four months old, not to let them run out to fresh grass, but have them in a yard where they can run for exercise, and where there is a cool clean stable where they can go to get out of the hot sun, and away from the flies. It will pay to keep up the milk feed till six months old. When it comes cool weather next fall put them in stanchions nights. Feed them as great a variety of hay and fodder during the winter as possible with 2 or 3 pounds of whole oats and bran, or oats only, each day. I advise putting them in stanchions while so young so as to train or educate them to that mode of confinement, for, when they come to be cows, there is where they will be kept most of the time during the winter season.

Handle your heifers; treat them gently and kindly, and you will have no trouble breaking them to milk.

Ration for Milch Cows.

I think as good a grain ration as you can get for cows in milk, is one-third bran, one-third ground oats and one-third corn meal, all by weight, about 12 to 14 pounds to each cow daily. Be guided as to the quantity by the appetite of the cow, and her ability to turn her food into milk. The corn is given to maintain the condition of the cow. It is not the best milk producing food; but some heavy milkers have the ability to turn almost any kind of food into milk. Such cows will bear more corn. Give them all the good early-cut clover hay, corn fodder, and straw they will eat, giving as great a variety each day as possible. In the summer, if they have good grass and plenty of it, that will do very well, but I think it will pay even then to feed a small ration of grain.

Now, this is in the direct line of rearing a good herd. By the treatment I have described you will develop and improve your cows. They will, perhaps, produce 50 pounds more of butter each next year, on the same kind of fare, than it is possible to get out of them this year; and the year after next you will get still more. The more milk you manage to make a cow give, the more she can give as you develop her capacity to do so, until a certain limit is reached, and she will in a measure, transmit these improved qualities to her progeny.

Test Your Cows.

Weigh the milk of each cow separately every day, or at least once a week for the year. Test it frequently to see what per cent. of butter it contains. At the end of the year foot up your figures, average your per cent., and see what each cow has done. If you have any cow that makes less than 150 pounds the first year get rid of her, she pays only for her feed and gives you nothing for your work. With the treatment I have been advising, you ought to get from 200 to 250 pounds the first year, and considerable more the next year.

Have your heifers come in when they are two years old. Use a full blood Jersey sire, the best you can get; one, if possible, that is five or six years old, that has daughters that have become cows, so that you can better judge of his merits. I have advised you to grade up with Jerseys. Some other dairy breed, particularly the

Guernseys, may be just as good. But I believe the Jersey will give as large a return for the food consumed as any other breed, and they being more plenty, you can, no doubt, grade up with them with less trouble and expense. When once you have started with a breed, follow up that line, and don't mix breeds. Above all thing don't try to raise the general purpose cow. I tried hard to get her, and did get her, but she was profitable for no purpose, and that kind of foolishness cost me very dear.

When your heifers come in, weigh and test their milk for a whole year, so that you can tell without any guess work, which produces the most; and when you have any to sell always let the poorest go. Let your standard be solely, the amount of product, and count as nothing such immaterial things as color or particular markings, or fancied beauty of forms or features, for they will not produce butter; and, after all, "handsome is that handsome does."

Get a Uniform Herd.

If it should happen that the daughters of one particular cow—for instance, the brindle one—should average considerably better than those of the others, she is the cow to tie to, to be the source from which shall, in time spring your whole herd. She may not produce as much as some of your other cows, but she has, no doubt, got good blood back of her that shows in her deccendants, all of which you should keep (except some poor ones if there should happen to be any such) and in a few years your whole herd will have some strong resemblance, with their pedigree all tracing back to "Old Brin."

Results.

And now, my dear friend, if you wish to profit by the experience of others, and will follow substantially the plan I have outlined, I shall expect, if I visit your place a dozen years or so hence, to find that your mortgage has long been paid, and the productiveness of your farm doubled. You will be a happy, contented and prosperous man, with a pleasant family enjoying the comforts of life. The grumbling and complaining disposition you manifested when I saw you at Jefferson will have entirely disappeared. You will have a splendid herd of cows, for which you have the greatest admiration, and in which you take great pride, and in the rearing of which you have taken immense pleasure. "They will produce more than 300 pounds of butter each a year," you will proudly say. You will have a large and convenient barn with a large silo, and a snug little house with pleasant surroundings.

While you have been developing and improving your cows, you have been developing and improving yourself, by the exercise of the thought, study and close attention to business necessary to success.

You will be a more obliging neighbor, a kinder husband and father, and a better Christian in consequence of having exercised the care, patience and kindness necessary to rear a *good dairy herd of cows.*

DISCUSSION.

CHAS. BRIGHAM—How long would you keep your cows?

MR. GOODRICH—I would keep them as long as they gave me a good profit. I have had them do well until they were 14 or 15 years old. Sometimes I do not keep them until they are 3 years old.

J. M. TRUE—What kind of grain would you give the heifers while developing?

MR. GOODRICH—I would give the feed that would make them grow and come to maturity young, but not put on flesh; I wouldn't feed corn or timothy hay; it would be clover hay and oats or bran and ensilage.

GEO. WYLIE—What constitutes a good dairy cow?

MR. GOODRICH—One that will make 300 a year.

GEO. WYLIE—Nothing less than that?

MR. GOODRICH—It might be; that ought to be the standard; no man ought to be satisfied with less than that.

GEO. MCKERROW—How is he going to find out whether he has a good dairy cow in his herd?

MR. GOODRICH—By testing her, weighing her milk every other day or occasionally, and keeping a record of it.

THOS. CONVEY—How would you test it?

MR. GOODRICH—Test it by setting the milk by itself. Take a day's milk and stir it into butter. That tells me what I can get out of it. It may may not tell what there is in it, but it tells what I can get out of it.

G. C. HENDIE—Do you discard any of your heifers in your dairy work, and if so, what per cent.?

MR. GOODRICH—I sell off from my herd the increase and they are the poorest cows, that is about 30 per cent. of them go every year.

H. C. THOM—Who buys them?

MR. GOODRICH—Anybody that don't know better.

H. C. THOM—Your neighbors?

MR. GOODRICH—They are sold and shipped to Chicago; the ones that the stock-buyers want are the ones I don't want to keep.

MR. SNOWDEN—Can you get scrub cattle and begin dairying with them successfully?

MR. GOODRICH—I think you can.

WELDON VAN KIRK—How much importance do you attach to exercise in a dairy herd?

MR. GOODRICH—The calf and the heifer ought to have exercise to develop their muscles, but after a cow comes to giving milk I am well satisfied they need but very little exercise. I tried that a year ago last winter. I had one cow that had a notion of milking herself. I kept her in the stanchion. She would be let out before the rest twice a day; she would walk about 60 feet to the tank, and being alone would walk right back and put her head in the stanchion. She wasn't out to exceed 10 or 15 minutes a day.

J. H. WISE—I would like to ask at what age a heifer should drop her first calf?

MR. GOODRICH—I wouldn't want them to have calves before they are 2 years old.

H. C. THOM—What effect would lack of exercise have upon the offsprings?

MR. GOODRICH—That cow had a fine, large heifer calf in the spring. That is the only one I ever kept confined so closely, and she is doing well this spring.

MR. RUNDELL—Which do you prefer to raise, spring or fall calves?

MR. GOODRICH—Fall calves can be raised with less trouble than spring calves.

H. C. THOM—If butter was the same price the year round, would you encourage having calves dropped in the spring or fall?

MR. GOODRICH—There would be very little difference now that I have a silo. I think that if a cow comes in in February, and you have dry feed through the winter, you can get more out of her during the year than you can to have her come in in the fall, but with ensilage I am pretty well satisfied you can get just as much out of a cow coming in in September or October as out of one coming in at any other time.

GEO. WHICHER—Isn't it more trouble to feed her?

MR. GOODRICH—No; it is less work taking the whole year through to have them come in in the fall.

R. B. BROOKS—Do you warm the water for the cows?

MR. GOODRICH—I do.

R. B. BROOKS—Don't you think it is better to turn them out twice a day to drink?

MR. GOODRICH—I shouldn't object to having the water in the barn.

Do you get sunshine in your stable?

MR. GOODRICH — There are plenty of windows that admit sufficient light on sunshiny days.

H. ROBBINS—How soon do you take the calf away from its mother?

MR. GOODRICH—When it is three or four days old.

MR. SNOWDEN—How much of an outlay in cash would I have to make to do successful dairying with a few cows?

MR. GOODRICH—If you wanted to do it as cheaply as you could, it wouldn't be a very large outlay. You need a tank and five or six cans. I think you could fix up for setting your milk at a very small outlay, $15 or $20.

GEO. WHICHER—I would like to know what temperature you mean by warm and cold water for dairy stock. If spring water came out of the ground smoking in winter time, would it be necessary to warm such spring water?

MR. GOODRICH—If I had water at 48 or above the temperature of the earth, and cows would drink it at that temperature, I wouldn't be to the trouble of warming that water.

H. C. THOM—Wouldn't you if the cows had to go 80 rods to get to the spring?

MR. GOODRICH—I wouldn't have them go 80 rods to the spring. Where water is pumped into a tank, unless you have a heater, the cows will have ice water all winter, which isn't best.

MR. DENNIS — Wouldn't it be more profitable for the average farmer to have a good, fair-sized cow that would give a fair amount of milk than to keep a Jersey cow?

MR. GOODRICH.—That comes into the general purpose cow question. I don't believe any individual ever tried harder than I did to get that cow. I couldn't be reconciled to the Jersey. Mr. Curtis here knows it. I thought I had got her once, I will describe the cow. I bought a 2-year-old heifer of the old style roan Durham of the wonderful milk family of that breed. She was a beautiful specimen—at least I thought her so at that time. She had a very large fine udder, and when she got to be four years old she used to give 60 pounds of milk a day when she was fresh. Sometimes she gave more, and that was fairly good milk that would test four pounds to the hundred, so that she made nearly two and one-half pounds of butter per day. When I sold her she brought $75. Now, that is as good a general purpose cow as you can get. She started out with a good quantity of milk, but she didn't hold out with this quantity of milk, but kept running down, and in seven months she was practically dry. I used to strip her for a month longer. Well, by occasionly weighing the milk and testing it, I figured that she produced 256 pounds of butter in a year. You see that is a pretty good cow. That is just the cow you are asking for, but I never made one cent of profit on her except when I took in the $75. Her weight ran from 1,500 to 1,700; when in good condition, towards 1,700 pounds. She was two cows in one in size, and took nearly the feed of two small cows, so you see when you come to take that into consideration, it was small doings.

Now, I will compare her with another cow. I had a cow that weighed just 800 pounds, half her size, and took just half the feed, perhaps a little more. She had the dairy form, and that cow produced 256 pounds, as near as I could figure, the same as the big cow. The big cow took $25 worth of feed more than the little cow, so I made $25 profit a year on the little cow and milked her 12 years and sold her for $15, though I got $315 from her, and all I ever got from the other was $75. The little cow was worth $240 more to me than the big cow. You see I want to give the general-purpose cow all the advantage I can. I have an 800-pound cow that makes 120 pounds more than this one. She will make 375 pounds at least in a year. That cow with the same way of figuring would make me $500 more than I would make out of the big cow.

R. B. BROOKS—How do you think the two cows compared in regard to the number of pounds of milk? Where I live a man would get as much for 100 pounds from one as from the other.

MR. GOODRICH —The big cow gave some more milk; it was just about average milk. The other cow was not a rich milker; I think it took some 23 or 24 pounds of her milk to make a pound of butter. But the little cow gave milk eleven months in the year and the big cow only seven.

J. H. WISE—Do cows that are fresh in the fall give as much milk in the year as those fresh in the spring?

MR. GOODRICH—I can get as much out of them with ensilage when they come in in the fall as when they come in in the spring.

MR. DENNIS — Do you consider it any more trouble to keep a beef cow with a full flow of milk with plenty of feed than a dairy cow?

MR. GOODRICH—When you undertake to feed her to keep it up, she turns the feed into beef instead of milk. I cannot make a beef cow give as much milk as I can a dairy cow.

BUTTER-MAKING ON THE FARM.

By THOMAS CONVEY.

Conditions of Success.

This depends on circumstances; where a few cows are kept on a large or medium sized farm, where much other work has to be attended to, it hardly pays to manufacture butter for the general market. A small quantity requires almost as much time in manufacturing and marketing, and equally as much attention as a larger quantity, and rarely sells as well, owing to the fact that each package should contain butter of the same quality, with regard to salting, color, degree of freshness, etc., this being more difficult to secure where a package contains different churnings. Buttermaking on the farm, if conducted in a business-like way, will certainly pay as well, at past or present prices as selling milk to cheese factories, at sixty to sixty-five cents per hundred, it being contracted for that price the present season. If skimmilk is worth twenty cents per hundred, and I consider this a low estimate. If hauling milk costs the patron another twenty cents per hundred, and how much less does it cost him where he delivers twice a day? If you allow anything for loss of fertility, occasioned by selling milk off the farm, and then deduct two per cent. of gross income which goes to factory owners, this being the custom in southwestern Wisconsin, and you will have some difficulty in convincing the maker of good butter of the advantages of selling milk and feeding whey.

Quality Before Quantity.

The gathered cream butter factory, is scarcely more popular, where the proprietor determines the amount and quality of cream, and the price he will pay, the latter depending on the price he receives. This, in turn depending on the quality and quantity of food given each cow, and the cleanliness, care, and intelligence of each and every patron, creamgatherers and buttermakers. In the separator factories they run less risk of producing an inferior quality of butter. The patron does the hauling, and this system, though the least objectionable of the factory systems, will hardly become popular until milk is paid for according to quality not quantity; this being also an objection to the cheese factory. Milk should be set as soon as possible in cold water, in preference to cold air, and in ice water, in preference to cold spring, or well water. Yet good butter can be made from cream secured in any of the ways mentioned, provided the air or water has no objectionable odors. The temperature should not be below 40° nor should it run above the normal temperature of spring or well water. When set in cold air it should be at a lower temperature than when set in water, the latter being the best conductor. The more rapid the cooling after being set, the more perfect the creaming. Delay in setting milk always results in loss. Aeration of milk will improve its keeping qualities, but retards creaming and should never be resorted to in buttermaking.

If the temperature should fall much below the normal heat, when obtained from the cow, warm water may be added not to exceed 6 to 8 per cent. at a temperature not to exceed 125°.

Skim the Milk Sweet.

I prefer to skim cream when sweet, and if held it should be at a low temperature, to prevent ripening. In warm weather it is safer to put it in water where milk is kept, churn as soon as possible as it gains nothing by age. When you wish to ripen it, keep it in an atmosphere of about 60°, when it should ripen in about twelve hours. In winter time where held at a low temperature, it will be necessary to raise the temperature of cream to 60° or even slightly above that before trying to ripen. It may take twenty-four hours to ripen in winter time. I prefer to, churn when cream is slightly sour raising the temperature to 64° before starting to churn in cold weather. In raising the temperature be careful not to over-heat any portion of cream. Do not pour warm water in it, but place vessel containing cream in warm water, and stir vigorously to secure uniformity of temperature. This being essential to uniformity of ripening, the latter being necessary to secure the greatest degree of churnability.

General Directions.

Cream prepared in this way should churn in thirty to forty minutes. When butter comes in small grains, stop churning, allow it to stand a few minutes that butter may rise to the top, draw off buttermilk. Should butter come with the buttermilk, you have not churned enough, or your cream was over-ripe and too thick, in the latter case add weak brine or water, when buttermilk is drawn off, wash butter three times, using weak brine the first time and sufficient water each time to float butter. The last washing should be nearly clear, taking care to keep the butter in granular condition until buttermilk is washed out and salt incorporated, working just sufficient to secure an even distribution of salt or the color would not be uniform. If you wish to salt in the churn use 1½ to 2 oz. of salt to each pound of butter, leaving sufficient moisture in the butter to dissolve the salt, and allowing it to stand about one-half hour expressing surplus moisture when packing. I prefere to weigh butter and salt at least one ounce to the pound, salting and working on the butter worker and packing immediately. Good butter contains 10 to 12 per cent. of water, but it should show no trace of buttermilk. Avoid over-working, or any plastering motions in working butter, or finishing packing as they destroy the grain and keeping qualities and give the butter a greasy appearance. Butter color is a commercial necessity at least during a portion of the year. It should be added to the cream first before starting to churn.

Butter Granules.

The grain of butter may be destroyed by over-heating, or freezing, milk, cream or butter. They are not similarly affected by the same temperature. The flavor may be injured by milk, cream, or butter being kept where it would come in contact with odors from cooking, smoking, decaying vegetables, bad water, etc.

Aroma.

The flavor may also be affected by the quality of the food, grass in June producing a desirable flavor, but additional feed may be given at any time as it improves the flavor, increases the quantity of the product and improves the keeping qualities. As butter from dry feed melts at a higher temperature, mixed foods produce better flavor than any single food, and rich foods produce the best flavors if they are of desired quality. Immature grass is injurious to body and flavor, weeds, cabbage, etc., will give objectionable flavors. Use best grades of dairy salt, and do not store where they will take up odor of kerosene, fish, etc. If churn or butter worker is inclined to get mouldy as they sometimes do in damp warm weather, clean thoroughly and rub on dry salt.

Packages.

In preparing packages I prefer to throw in salt and then scald, cover up and the steam will make it pickle-tight. Use cold water to rinse and rub inside with dry salt. Never put poor butter in fancy packages, and when you can make good butter you may very safely brand it, there is no necessity of putting your name on it, but be sure you do not brand inferior goods, then it can be sold like a popular brand of baking powder, on its merits. In finishing top of package use dairy cloth on top of butter, then make a paste of dairy salt and put it over cloth. It will prevent top of butter from getting over-heated and will also guard against flavor of lid. Remember that good butter must have perfect grain, high, fresh flavor, desirable color and a sufficient amount of best quality of salt. That it must be put up in clean, bright, packages of best quality and of a style the market demands.

DISCUSSION.

L. H. ADAMS—What is the objection, Mr. Convey, to a lower temperature than 40 degrees in which the milk is set?

MR. CONVEY—Because the milk condenses down to that temperature and after that it expands; condensation of course increases weight, and an increase in weight increases the comparative difference between the butter fat and the milk serum.

C. I. BRIGHAM—I should like to ask if cream will likely get sour standing only twelve hours?

MR. CONVEY—In summer it will; in winter twenty-four hours.

SUPT. MORRISON—Can a pound of finished butter be made to retain any more than a half ounce of salt?

MR. CONVEY—I think not; chemists state that that is the case and I believe it to be so.

SUPT. MORRISON—Is the other half ounce, if it is undissolved, of any benefit to the butter?

MR. CONVEY—I think not, except that the stronger it tastes of the salt the harder it is to detect decay in the butter.

C. P. GOODRICH—Why do you put in one ounce?

MR. CONVEY—Because the market demands that.

C. P. GOODRICH—Does it retain that?

MR. CONVEY—By having dissolved salt in it, it will.

MR. GOODRICH—Does the market demand that?

MR. CONVEY—Sometimes it does; I have had more fault found with my butter on that account than anything else.

C. P. GOODRICH—Isn't it a fact that the saturating brine makes the butter salt, and the more you work the butter the less salt it will have in it?

MR. CONVEY—That is so.

C. P. GOODRICH—Doesn't a portion of that ounce run out in the brine in working the butter?

MR. CONVEY—Of course it is impossible for an ordinary dairyman to determine how much salt is retained, but in selling butter I find that there is more demand for more than an ounce than for less than an ounce.

GOV. HOARD—Of all the qualities in butter which do you estimate as the most important in securing a good price?

MR. CONVEY—Flavor.

GOV. HOARD—I think you are right. Now, how long can you retain the first fine flavor that stamps the value of butter?

MR. CONVEY—I would put the limit at two weeks, and possibly less than that time. I have always found long keeping a failure.

QUESTION—Why set milk in ice water if you have cold spring or well water?

MR. CONVEY—The colder the water, not getting below 40°, the more rapid the creaming and the more thorough the creaming, and the quicker you can skim.

QUESTION—I have a spring that registers 46°; would you prefer ice water to that?

MR. CONVEY—Not as far as the butter is concerned.

L. H. ADAMS—What is the butter flavor, where does it come from?

MR. CONVEY—It comes from feed I think, breeding having very little to do with it; that is you can't produce a fine flavored butter on poor feed. I think it rests entirely in the feed and the manner of handling.

WELDON VAN KIRK—I heard a gentleman say the other day that a person is liable to injure the flavor of the butter by breaking the grain in working. I would like to have Mr. Convey's opinion about that?

MR. CONVEY—It would certainly destroy the keeping qualities.

WELDON VAN KIRK—Would it injure the flavor at the time?

MR. CONVEY—I think over-working or over-washing will destroy the flavor.

C. P. GOODRICH—Will the milk from two cows kept on the same feed be of the same quality?

MR. CONVEY—I think if the cows are healthy that it will; it will be just alike with regard to flavor.

C. P. GOODRICH—That is not my experience. What is your opinion, Gov. Hoard?

GOV. HOARD—I think there is an individual difference there.

C. R. BEACH—I don't want to tell but one story. I was in Chicago sometime ago and asked the steward of the Palmer house, who had been buying the butter from a celebrated herd of Jerseys, what kind of butter he got. Pretty good, he said. But he says, no such butter as you used to send to the West Side Briggs house when I boarded there; how did you make it? I said, We made it down in a dirt cellar, out of the milk of common cows, fed on marsh hay, with my swill barrel at one end of the milk rack and a soap barrel at the other. Well, he said, it was good butter anyway. What gave the quality to that butter? The cows were farrow cows being fed with Indian meal to make beef of them. The quality of the feed does make the quality of the butter, and the cow that is not with calf will make a great deal better flavored butter than a cow that is with calf.

GOV. HOARD—After a cow has got six months along in gestation, doesn't the flavor leave the butter?

C. R. BEACH—Certainly; if it has anything like the flavor of the butter of a new milch cow or farrow cow.

TEMPERATURE IN BUTTER-MAKING.

By D. W. CURTIS, Secretary of Wisconsin Dairyman Association.

Setting Milk Warm.

The whole process of good butter-making is governed almost entirely by temperature, from the time the milk is drawn from the cow until the cream is ripened and churned into butter.

The milk when first drawn from the cow if immediately placed in cans and submerged in water standing at 45° to 50° all of the cream is thrown up between milkings. If allowed to stand around until partially cold and then placed in water at 55° to 60°, the loss is at least from 5 to 10 per cent. The importance of setting milk, while warm, in water cold enough to throw up the cream, is of a sufficient value to warrant any one, who is in the habit of doing this work when they have time, in making the test. The temperature of the milk, together with the temperature of the water in which it is placed, has very much to do with the profits of the cow.

Care Will Give Success.

It has been an inquiry of many why separators are taking the place of gathered cream. The answer is one of temperature. The farming community, where the cream is gathered, are careless and shiftless in many cases in taking care of the milk. The farmers do not realize that the poor care given to it, comes out of their own profits. If the milk stands around for half an hour before being placed in cans, and the wind, and the boys, do not feel like pumping fresh water into the tank, it is all the same; the farmer never once thinking that he is only beating the creamery man out of the quality and himself out of the quantity. If this same milk had been brought to a creamery where the separator is used, it must be brought to a temperature of 70° to 75°, according to the season of the year; the butter maker is careful that his separator runs at the right speed, and the milk is just at the right temperature to insure the best results. If the same care should be exercised in caring for the milk on the farm, and the temperature looked after as closely as the butter maker is obliged to look after it, to get the best results, the two systems would vary but little. In fact, there are gathered cream creameries that use the submerged system of setting milk that are paying dividends quite as large as any creameries in the country. The success of both methods is one largely of temperature, for should this be neglected the results would be largely against them.

Flavor Depends Upon Temperature.

In the ripening of cream temperature plays almost as important a part as it does in the creaming of milk. In open vats, cream ripens best at 60° or 62°. If it is below that, the chemical action takes place very slowly; if much above that degree, it imparts anything but a pleasant flavor to the butter.

The generally accepted theory of ripening cream is that it must be frequently stirred and come in contact with the oxygen of the air to develop the aroma so much sought after in good butter. Cream which is allowed to ripen in all degrees of temperature bring different degrees of acidity, and consequently the butter is affected by it. If the acidity in cream could be ascertained the same as the temperature, by the use of the thermometer, I venture the assertion that there is not one butter maker in a hundred that could tell the acidity within ten degrees.

Boyd's Starter.

The Boyd process of ripening cream is directly the reverse of all this, and is wholly controlled by temperature. Sweet skim milk (from fresh cows preferred) is taken and warmed up to a certain degree and placed in a can with non-conducting walls so that it shall not be affected by heat or cold, where it is allowed to remain from 18 to 24 hours. It is then ready for use. This produces a perfect lactic fermentation. The cream is sweet, and is placed in a vat or can with non-conducting walls, so as not to be affected by the surrounding temperature. It is heated up to 68° or 70° and 1 or 2 per cent. of the lactic ferment added and thoroughly mixed in. The vat is immediately closed air-tight and left there from 18 to 24 hours. This lactic ferment which has been added commences to work through the entire mass of cream, and imparts to it the same principle, and producing the chemical change necessary preparatory to churning. It is far better to supply the cream with the right kind of ferment, that shall produce uniformity in quality, than to have the cream seek its own agent for ripening, containing many of the destructive elements which go to destroy fine butter.

Temperature Means Profit.

Tempering cream for churning must be governed very largely by the cream that is to be churned, and this knowledge must be gained by the butter-maker who is doing the work. The rule laid down in books, that 58° to 62° is the right temperature to churn at, will not hold good in all cases. A prominent creameryman once said: "I test my butter-milk with Short's test, and if I find any butter-fat remaining, I change the temperature of the cream—and keep on changing the temperature until the right degree is found that leaves the least butter-fat in the butter-milk." This knowledge must be gained where the work is done, as the cream from different creameries and dairies will churn best at different temperatures.

Mistakes are often made in getting the temperature of cream, both in warming up and cooling down, from the fact that the serum or watery part is affected by heat and cold very quickly, while on the contrary the globules or fat in the cream are not so sensitive to the different degrees of temperature. As the butter globules have time to absorb the heat or cold, it is not infrequent that the temperature is changed from 5° to 8°. Should it rise that much and the butter come soft, it is charged to friction in churning." Cream may be cooled very rapidly to the required temperature, yet the butter will be soft, which clearly indicates that the butter globules were not sufficiently cooled before the churning commenced.

General Rules.

The process of butter making may be governed very largely by a few genera rules: obtain a good themometer and use it; note the temperature that gives the best results; let cleanliness and temperature be the controlling factors. See that the milk as soon as drawn from the cow is placed in cans and summerged in cold water. Skim the cream sweet, and keep it so by placing the can in cold water, until ready for ripening. Warm it to the right temperature and furnish it with a ferment that shall give it the right degree of acidity in a given length of time, or let the cream furnish its own agent for ripening, and *guess* at the proper acidity. Determine by experiment at different seasons of the year the temperature in churning that shall give you granular butter and leave the least trace of butter fat in the buttermilk. Wash all traces of buttermilk from the butter, work it lightly at a temperature of from 58 to 62 degrees.

DISCUSSION.

James Spensley—What do you mean by ripening?

Mr. Curtis—I mean getting it of the right acidity; getting it just right to churn.

James Spensley—Is it necessary that the cream should be sour to churn?

Mr. Curtis — No, sir; I suppose you can churn sweet cream as well as sour, if you so desire.

James Spensley—Would it have as good a result?

Mr. Curtis—I don't suppose so.

James Spensley—Would the butter be as good.

Mr. Curtis—That is a question that doctors disagree on; the theory is nowadays that we have all got to make sweet cream butter; that is the latest fad in butter-making.

L. H. Adams—That raises one more question. If feed makes the flavor in butter, why are we objecting to sweet cream butter, as some of us do and some do not. Why do those who object to it lay it to the cream being churned sweet, if, as they claim, the flavor all comes from feeding.

Gov. **HOARD**—You have the same butter with just one difference—the acidity.

C. R. **BEACH**—You will admit that there is a flavor in a rose leaf, will you not? but you will not get one-half of it until it is bruised.

Gov. **HOARD**—The acidity you think brings it out?

C. R. **BEACH**—Souring.

JAMES SPENSLEY—Would you recommend churning sweet cream at the same temperature as you would sour?

MR. CURTIS—I do not recommend churning sweet cream.

JAMES SPENSLEY—There is lots of cream churned sweet. Now would you churn it at the same temperature?

MR. CURTIS—No, I suppose not.

SUPT. MORRISON—What would the temperature be?

MR. CURTIS—Anywhere along in the fifties—fifty to fifty-five degrees. I know nothing about it excepting what I have read; I have never churned any. I believe down in Virginia, where they have been making sweet cream butter for the President, they churn the cream at 55 degrees.

Gov. **HOARD**—That is English butter.

THOS. CONVEY—What ferment do you use and how would you produce it?

MR. CURTIS—I told you in the paper I would produce it from sweet skimmed milk; I would heat it up to 90° in a water bath and would allow it to stand from 18 to 24 hours; it then becomes lobbered milk. Take off the top of this and add one or two per cent. to the cream which has already been heated to 75°; shut the vat up tight. This ferment wants to be mixed through the cream, the same as yeast works through bread, and it gives the cream a nice, pleasant acidity, and when it is so treated, 18 to 24 hours will produce the cream ready for churning, and will also do so every day in the year. But when you ripen in open vats or open cans I claim there is no man, not even a professional, can tell within 10° or 20° what the acidity of the cream is. They get very close to it sometimes. Here are Mr. Goodrich and Mr. Beach, they get their cream very nice, because they are careful of the temperature of their rooms and keep it pretty near the same all the time. But generally people who ripen cream in that way can't get within a row of apple trees of the proper acidity for churning. Sometimes it is too sour and sometimes not sour enough.

C. I. **BRIGHAM**—What proportion of the ferment do you use?

MR. CURTIS—From one to two per cent.; if I had a hundred gallons of cream I would use from one to two gallons of ferment.

SUPT. MORRISON — We are very fortunate to-day in having with us Mr. C. R. Beach, of Whitewater, who supplied the Sherman House in Chicago for many years, and who is called one of the best butter-makers in the state; and also Mr. Goodrich; and we have here a couple of pages of formulated questions that will bring out a great many interesting suggestions and also a great deal of experimental work and I would like to have Mr. Beach take the paper and read the questions and give his answers to them. It will help us to make up a good *Bulletin* and you will receive a great many suggestions in this line.

C. R. **BEACH**—"Please give a statement of your dairy, how many cows, how many pounds of butter sold, and what it brought?" I have never kept a dairy of cows continuously for a year. We make butter largely in the winter and milk many more cows in the winter than we do in the summer. For the last three winters we have been milking about thirty to thirty-five during the winter. I think last year the sale amounted to about 9,000 pounds, which would be an average of about 300 pounds to the cow. The average price last year was 28 cents and this year ending January, 1890, it was 21 cents.

"What does it cost to keep cows?" That question I will skip because it would be mere matter of inference.

"What is the ration?" We vary it somewhat. This winter we have fed twenty-five pounds of ensilage, 12 or 15 pounds of shock corn, and a little oats mixed, eight pounds of bran, and probably five or six pounds of hay. Our usual feed is about forty pounds of ensilage made from Yankee corn, ten pounds of bran and what hay they will eat at night; we don't feed hay but once a day.

"Do you feed the mill stuff wet or dry?" Dry.

"Do you run a winter dairy?" Yes.

"How many pounds of milk for a pound of butter?" Last winter it would take about eighteen; this winter we are so situated that we have a different class of cows (somewhat) and it takes about twenty; day before yesterday I think it took just an even twenty, five pounds to the hundred.

"Do you groom your cows?" We do not.

"Do you summer feed with grain and what is its influence upon butter?" We always summer feed cows when giving milk; we think it not only improves the flavor of the butter but gives it solidity; butter made upon a grass feed alone has not quite the consistency that it has with other feed. In damp or rainy weather we occasionally give twice a week a feed of dry hay.

"How many pounds of butter do you make per cow for a year?" I answered that before as nearly as I can.

"How long do you keep cream before churning in summer; also in the winter?" We churn every day in the summer. The milk is always sour with us when skimmed. In the summer when we churn every day there will be two skimmings; morning and night and churning the next morning. In the winter we churn every other day and have four skimmings.

"Do you wash your butter in the granular form?" We do.

"Do you add salt to wash water?" Yes, always. Sometimes instead of putting it into the water we throw salt right into the churn before adding the water.

GOV. HOARD—Why do you add the salt?

C. R. BEACH—Well, because the high-toned dairymen say it is best. It tends to lower the temperature and brine is heavier and floats the butter better. I see the man from Oregon recommends the putting of salt into sweet cream. I sometimes put in a handful of salt in the cream when I put it into the churn.

"Would you advise coloring butter?" I certainly would, because the market demands a high colored butter.

"How many times do you work the butter and how?" We work it but once. We wash it; salt it in the churn; revolve it a few times; put it upon a butter worker and press the moisture out slightly and put it in the tub; it is in the tub in less than half an hour after it comes and it is not disturbed after that.

"How do you keep your stables free from odor?" Only by ventilation. We have not used land plaster and I therefore cannot speak anything about that.

"Do you allow your help to misuse cows?" Not if I know; I presume they sometimes do.

"What temperature do you keep your stables?" I cannot answer that question definitely; we keep about forty head in a stable seventy by thirty, and we ventilate the place, and such weather as this we keep the windows open. I think fifty degrees is warm enough and some of the time it does not reach that. It never freezes in the stable so as to stiffen manure at all; we try to keep them comfortable.

"At what age do you have your cows come in?" I buy my cows in milk generally.

"How long do you milk your cows before letting them go dry?" Too long altogether. I think every cow ought to go dry two months every year. I often milk my cows until I am sorry I have milked them so long. I think ten months is long enough.

"How much more stock can you keep on your farm than you did before you commenced dairying?" I cannot answer that question but I differ from many as to the opinion that simple dairying improves the farm. You cannot retain the fertility of your farm if you stock it full of cows and send the milk to the factory and do not feed a grain ration.

"What sort of grasses do you prefer, mixed or straight?" I prefer mixed grass and for cows for pasture I prefer grass that has never been disturbed; I think it is better and richer in butter fats, gives a better flavor and holds it longer.

"Do you have any difficulty in drying up your cows?" None at all. Tie them to a post for a week and they will dry up all right. A man asked me for a receipt to dry up a cow and I told him that.

"Have you ever had any difficulty with abortion in your herd?" I have had a great many cases of that.

"Is it contagious?" I don't know.

"Did it continue in winter?" It did.

"How much corn would you feed a cow giving milk?" Five or six or seven pounds would be the extent that I would ever feed it. If I couldn't have but one feed I would make it wheat bran without the corn.

"Is a ton of bran worth as much to feed as a ton of oats?" Perhaps not, but a dollar's worth of bran ordinarily is worth more.

"Would you thresh oats or feed them in the straw?" "Would you run them through a feed cutter?" I would feed them in the straw and run through a feed cutter every time.

"What is the best kind of hay to feed cows?" If I was feeding corn and cornstalks I would prefer clover; June grass hay I think is fully equal to it.

QUESTION—Did you ever use millet?

C. R. BEACH—I never did.

"Is well cured corn fodder with the ears on and run through a cutter as good feed as corn ensilage?" It is not. If a man has not got a silo I would certainly recommend running this corn through a feed cutter, but it lacks softness; it is not as thoroughly digested, more corn passes the cow, it is more work to prepare it and is not as desirable.

"How many pounds of butter should a cow make a year in order to make her profitable to her owner?" That would depend on how much the butter sold for and how much you fed the cow. You cannot fix any particular number of pounds; the more pounds of butter she gives the better she pays. How low a point you may go and still make a profit you should not find out; you should find out how many pounds she can make.

"Is any special breed necessary to secure a good butter cow?" We have breeds of cows in which a large percentage of them are better butter cows than others; there are good cows in all breeds and good cows in mixed breeds; but if I were going to take my chances I would take grade Jerseys or full bloods.

"Do you test your cows?" Occasionally.

"How?" By churning each cow's cream separately.

"What variation do you find?" More than I want to.

"Can you change the quality of the milk by the feed?"

That is what I claim you can do. I claim that by feeding you can not only produce in her the habit of giving richer milk. You can't take her to-day and have the quality change tomorrow a great deal. I met a man some time ago who said to me, why do you have such great faith in feeding bran; I fed my cows half a ton in three days and I didn't see any great change. But you can, by continuous feeding, produce in cows not only the habit of giving milk, but can increase the richness of the milk simply by giving your cows good treatment under favorable conditions and surroundings. Corn when fed to excess will decreae the milk. The effect of corn upon milk is to render the fats solid or hard; to a certain extent that is desirable, but an exclusive corn feed is not desirable, and if a cow is inclined to fat rather than to giving milk she takes on fat at the expense of quality of milk; the effect of too much corn ration is that it renders the milk too tallowy.

GOV. HOARD—I want to ask if it is not somewhat liable, if you feed a cow too heavy a corn ration, to change her from a milking habit to a beefing habit, particularly a young heifer.

C. R. BEACH—I think so, and I think a cow at any time when from any cause she has begun to put on fat and shows a laying on of beef, you cannot very well stop it; she has been wrongly treated in some way.

"How is it with oats?" There is nothing better for butter or milk than oats, but the objection is it usually costs too much.

"How is bran for butter fats?" Bran is one of the best and cheapest rations, and if mixed with corn or oats it is almost invaluable; we wouldn't know what to do with it.

GOV. HOARD—Have you ever tried barley?

MR. BEACH—Some years ago I did, but some way I had the impression that the butter was drier and crumblier, that it had neither the solidity nor the richness of corn, nor the soft flexibility of bran. (These are all matters of opinion and not authority.) Bran gives a flexibility in winter which is very desirable; it is very much superior to corn. With hay and corn and oats, you make very rich and very solid and very high flavored butter—it is most delicious.

C. P. GOODRICH—Will the milk from cows having bran exclusively for their grain ration be richer in butter fats than it is where it is half corn?

MR. BEACH—I can't tell you, sir.

C. P. GOODRICH—I understand that it is not, but people generally think it is better where they are fed corn.

MR. BEACH—Those of us who are making butter for the profit aim to have winter dairies, and there is one advantage in this the cow is not so far gone in calf, and the flavor of the butter is not injured by her being in that condition, we get therefore a better flavored butter from her grain feed, than we would if she came in in the spring.

GOV. HOARD—The butter of a cow far along with calf is not worth as much in the market either.

MR. BEACH—No, sir. We know that it does not take half as much trouble to take care of cows in the winter as in the summer. We can afford to crowd them pretty strong in the winter.

"What effect has ensilage upon the quality of milk?" My friend Goodrich is a new convert, and he says it makes it better. I have been feeding it three years and I do not think it makes it any worse.

GOV. HOARD—A gentleman back of me inquires if you have ever fed rye.

MR. BEACH—I have never fed rye.

MR. WHICHER—It is miserable feed for cows.

"Do you feed roots?" I do not.

"Do you find any difference when you change from roots to ensilage?" I can't answer that.

I have found that there is one thing about ensilage, that the butter comes quicker than it does on dry feed; it comes quicker than June butter. We can churn out the butter fat from the cream and get a larger percentage from ensilage. When we can get 15 or 20 tons of corn ensilage to the acre that we know is good we don't want to dally with turnips. I know that ensilage is good and can be cheaply produced and will give a large amount of feed. Do you know that an acre of ensilage will more than furnish a cow rations for 365 days of the year and have enough left to pay for the bran she will eat.

GOV. HOARD—That is more than keeping a cow to the acre.

MR. BEACH—I merely say that it will give more than 365 days' rations and leave enough to buy the bran for her.

"If you desired to enrich your land rapidly, what ration would supply the most fertility?" Wheat bran.

SUPT. MORRISON—And clover hay.

MR. BEACH—Yes, clover hay, but wheat bran anyhow, and feed wheat bran in the summer for pasture. You will give back more fertility than you take from it. You may pasture a field indefinitely; feeding wheat bran rations and they will grow better all the time.

MY DAIRY EXPERIENCE.

By JAMES McPHERSON.

A Farm Dairy.

My experience dates from about the year of 1874, when I began keeping cows on a small scale, sending my milk to a cheese factory. This paid fairly well for awhile but, with high prices for making and low prices for the cheese, I concluded I could do better than patronize the cheese factory, so built a milk-house, bought a Cooley creamer and commenced making butter and shipping it to Chicago. I thought I was doing pretty well, and did make some money at it as the butter sold at very good prices.

About this time I read a report of some noted dairyman's herd, which had made overs 300 pounds of butter per cow in a year's time. I think this was in 1880. I got out my cash book and went to figuring.

Must Do Better.

I learned that, after allowing the cows credit for 365 pounds of butter used in the family, they had only produced 156 pounds per cow for the year. I thought this too great a difference to be true. I thought the 300 pounds to the cow man had stretched the truth into a pretty big yarn to advertise his Jerseys. At this time I had in my herd a half-blood Jersey cow, five years old. I thought she was a pretty good cow, although I had several others that would give a larger mess when fresh. I tested this cow about April 1st, 1880. The food she was having at the time was bran and tame hay, and from seven milkings we churned seven pounds of butter. This was an eye-opener to me, and from that time I have used Jersey sires in my herd. I found that beef cows were not the most profitable kind for butter-making.

Tries a Creamery.

Three and a half years ago I commenced taking my milk to the Fort Atkinson creamery, and from March following to the next first of March I received in cash a little over $63.00 per head, receiving my skim-milk back. The average price the butter sold for was within a small fraction of 25 cents per pound, deducting 4 cents for making, it netted me 21 cents Three hundred pounds of butter at 21 cents per pound amounts to just $63.00. For fear that you may think as I did about the 300 pound-yarn, I will say that I have no Jerseys that are for sale. In my herd there were ten two-year-olds and ten three-years-olds, heifers which I figured in as fifteen mature cows. While I do not give the whole credit for this increase in butter per cow, yet I believe a large part of it is due to the infusion of Jersey blood in my herd. I feed better than I used to, and my cows are all fresh in the fall of the year — two conditions which cannot fail to increase production.

No Use Kicking Against the Silo.

One year ago while in attendance at a Wisconsin Dairymen's meeting at Augusta, I sat on the anxious seat on the silo question, but before the meeting adjourned I was fully converted and determined to build me a silo. Well, I built one and now the only fault I have to find with it is, it is not half big enough. I think a dairyman wants about 12,000 pounds of ensilage per cow for the year, so as to bridge over any shortness of pasture or hay crop that may occur in a dry season.

HOW HAVE OUR GREAT DAIRY COWS BEEN BRED?

By T. L. HACKER.

Most farmers think that the phenomenal butter cows are accidents, not knowing or thinking that, as a rule, they inherit their butter capacity; some think it the immediate feeding and manipulation of the owner; others—don't *think* at all—and these last discredit the large butter tests; still others there are, intelligent breeders, who shrug their shoulders and wisely shake their heads and don't believe a word of it—presumably, because they have not the material, or having it, have not the patience or faculty to make the most of it.

To doubt the authenticity of most of our butter tests, corroborated and vouched for, as they are, by men of unquestioned integrity, men who in social and business circles stand in the foremost ranks, and whose word, no one would dare to question on any other subject, is utterly ridiculous, and as presuming as it would be for me to say, I do not believe the Holstein cows give the quantity of milk their owners claim—or to say, I doubt the statement of my neighbor, who says his Swigert will take him to town and back in two hours, because it takes my Percherons all day to make the same distance.

It is not but fair to assume that these records are true, and so, studying the pedigrees of some of these famous cows, we may find from whence and how their great butter heredity comes.

As a building to endure great strain or pressure, must be "builded upon a rock," so, must constitution and butter heredity be the foundation of the great dairy cow; this being secured we must next look to the lines of breeding, intensifying the nature by inbreeding, yet, not carrying it so far as to result in constitutional weakness or passivity, although there is very little danger, if the foundation animals are strong and vigorous, as will be seen by the breeding of the cows Volie, and Purest.

Specimens of Close Breeding.

St. Helier-45-was bred on the island of Jersey and was the result of forty years' inbreeding in unbroken family lines—he was imported, and was bred to cows, in the manner indicated by this pedigree of Volie.

St. Helier and Blanche produced Ianthe, 16 lbs. 10 oz.; St. Helier and Ianthe, Pyrola, 18 lbs. 6 oz.; St. Helier and Pyrola, Oxole; St. Helier and Ibi, Kalmia, 15 lbs. 8 oz.; St. Helier and Kalmia, Safrano, 17 lbs. 8 oz.; Oxole and

- **VOLIE**, 18 lbs., 1 oz.
  - Oxoli
    - St. Helier.
    - Pyrola, 18 lbs., 6 oz.
      - St. Helier.
      - Ianthe, 16 lbs., 10 oz.
        - St. Helier.
        - Blanche.
  - Safrano, 17 lbs., 8 oz.
    - St. Helier.
    - Kalmia, 15 lbs., 8 oz.
      - St. Helier.
      - Ibi.

PUREST, 13730 .... 15 lbs., 4 oz.
- Mercury, 432.
  - Jupiter, 93..
    - Saturn, 94, Imp.
    - Rhea, 166, Imp.
  - Alphea, 171..
    - Saturn, 94, Imp.
    - Rhea, 166, Imp.
- Nymphaea, 5141....... 18 lbs., 7 oz.
  - Mercury, 432. (See above.)
  - Phædra, 2561. 19 lbs., 12 oz.
    - Mercury, 432. (As above.)
    - Leda, 799 ... 14 lbs.
      - Jupiter, 93.
      - Europa, 176.. 15 lbs., 6 oz.
        - Jupiter, 93..
          - Saturn, 94.
          - Rhea, 166.
        - Alphea, 171.. 15 lbs., 8 oz.
          - Saturn, 94.
          - Rhea, 166.

Safrano, Volie, 18 lbs. 1 oz. There are thirty odd cows similarly bred and with similar results, a number of them several more removes with St. Helier as sire, with even greater results, and all showing good constitution.

In Purest, of the Alphea family, we have a little different form of inbreeding which has been carried to a degree seldom ventured on by breeders, and which has been, so far, very successful.

Saturn and Rhea imported from Jersey produced Alphea, 15 lbs. 8 oz., and also Jupiter, who was bred to his full sister Alphea and produced Europa, 15 lbs. 6 oz.; Europa bred to her sire Jupiter, produced Leda, 14 lbs. Jupiter and Alphea again produced Mercury; Mercury and Leda, Phaedra, 19 lbs. 12 oz.; Mercury and Phaedra, Nymphae, 18 lbs. 7 oz.; Mercury and Nymphae, Purest, 15 lbs. 4 oz., as a two-year old.

Every female in this pedigree since importation has made a butter record, and Mercury has twenty more daughters testing over 14 lbs.

These animals had good, strong constitutions and transmit their good qualities to their progeny.

These two examples are sufficient to demonstrate the fact that the closest inbreeding can be practiced without producing constitutional weakness or diminishing the ability to make a large butter yield.

Jersey Belle of Scituate.

In the year 1850, the old Massachusetts Society for the improvement of domestic animals, sent Mr. Thomas Motley to the Island of Jersey to purchase the best dairy animals he could find. He brought over the bull Colonel, said to be out of the best cow on the Island, and the cows Countess, 16 lbs. on grass only; Flora, 511 lbs. inside of a

Jersey Belle of Scituate, 7828...........
- Victor as below. 3550.
- Jenny, 7827....
  - Victor, 3550...
    - Pilot, 2549...
      - D. Swiveller, Jr., 276.....
        - D. Swiveller, 74...
          - Major, 75..
            - Colonel, 76.
            - Countess, 114.
          - Flora, 113.
        - Twilight, 977.
      - Nellie, 7825.....
        - Czar, 273.
        - Dove, 7824.....
          - Czar, 273.
          - Duchess, 548.
    - Minnie, 7826...
      - D. Swiveller, Jr., 276.....
        - D. Swiveller, 74...
          - Major, 75..
            - Colonel, 76.
            - Countess, 114.
          - Flora, 113.
        - Twilight, 977.
      - Dove, 7824.....
        - Czar, 273.
        - Duchess, 548.
  - Fannie, 7823.

year; Twilight, Jenny and Duchess, three excellent dairy animals. They were bred together until the blood of all these animals was united four times, culminating in this great cow that yielded, when six years old, 705 lbs. of butter in a year on light feed; the largest ration of grain fed to her during the winter of her year's test was only two quarts of bran daily. Two years later she made in one week 25 lbs., with a ration of two quarts each of cornmeal and bran.

She had a perfect dairy form, full, placid, intelligent eyes, a clean, thoroughbred appearance, thin, long neck, sharp withers, capacious body, high rump, thin incurving thighs, an enormous udder, measuring when fresh, five feet three inches, perfect teats and a navel remarkable for its development—she is considered the most perfect model of a dairy cow.

What a grand opportunity to establish a family of almost perfect dairy animals by breeding Jersey Belle to her own kin, was lost by the foolish prejudice against inbreeding, so that her wonderful butter heredity was dissipated and in a large measure, lost.

The dairy interest is to be congratulated that breeders are now more enlightened and their efforts more directed to holding together good blood lines, intensifying and strengthening the good results already attained.

It is still a mooted question, whether close breeding can be carried on indefinitely without constitutional deterioration; this is being thoroughly and intelligently tested by William Simpson, of New York, and thus far his experiments have been remarkably successful, as shown by the heifer Purest, whose pedigree you have seen.

Eurotas, whose yearly butter record exceeded that of Jersey Belle, is our next example.

The dam of Eurotas was the inbred Alphea cow, Europa, the product of full brother and sister. Eurotas was bred by R. M. Hoe, of New York, who, possibly doubtful of the wisdom of further inbreeding, sent to England for the young bull Rioter 2d, sired by Philip Dauncey's Rioter; he was bred to Europa and produced the great Eurotas that made 778 pounds of butter and dropped a strong, healthy calf within a year.

This cow inherited her butter qualities from both sire and dam.

A Great Jersey Breeder.

Mr. Dauncey was unquestionably the most successful Jersey breeder of his day. Judging from results he was a master hand at the business, for nearly half a century he bred for large butter yield, strong constitution and solid colors, and here let me say, during all that time he went only once outside of his herd for a sire, and only retained him until he secured a bull calf out of the desired cow, to take his place, which shows that outcrossing was no part of his plan. So firmly did he fix these desired points in his stock that breeders at the present time, resort to his strains to secure these most desirable points.

This is a marked illustration of the

EUROTAS.......	**Rioter, 2d**.........	**Rioter.**	
		———	
	Europa............	**Jupiter**............	**Saturn.** **Rhea.**
		Alphea............	**Saturn.** **Rhea.**

- **MARY ANNE OF ST. LAMBERT...**
  - Stoke Pogis, 3d..
    - Stoke Pogis.
      - Y'ng Rioter.
        - Rioter.
        - ——
      - Essay.......
        - Y'ng Rioter.
          - Rioter.
          - ——
        - ——
    - Marjoram.
  - Lolly of St. L....
    - Buffer...........
      - Lord Monck.....
        - Victor Hugo, Imp.
        - Pride of Windsor, Imp.
      - Amelia, Imp.
    - Camelia of St. L.
      - Lord Lisgar......
        - Victor Hugo, Imp.
        - Pauline, Imp.
      - Hebe of St. L....
        - Victor Hugo, Imp.
        - Portia, Imp.

great benefit conferred upon all interested in dairying, by the skillful breeder, who devotes his time and ability to establish certain characteristics he may have in view.

Selection the Basis of Success.

We may learn much by a close study of the pedigrees of his noted animals; it is evident from these, that he had no special formula, but combined those animals which would intensify and strengthen the points desired, regardless of kinship.

St. Lambert Family.

We will next examine the breeding of Mary Anne of St. Lambert, whose weekly and yearly record exceeded that of Eurotas, being 36 pounds in a week, and 867 for the year.

I have carried out the pedigree of Stoke Pogis 3d, to the third remove, to show that the sires of these two cows are descendants of Dauncey's Rioter, Eurotas being a grand-daughter, and the grand-sire of Mary Anne being an inbred grand-son of the same Rioter.

Lolly of St. Lambert, the dam of Mary Anne, traces three times to Victor Hugo, who has demonstrated that he was one of the most potent butter sires in the Jersey breed. He was bred on the Island of Jersey, and imported in 1868, by S. S. Stephens, who used him for a number of years and subsequently he became the property of a gentleman in Kenosha. Victor Hugo was as remarkable for his high spirit, as for the superiority of his descendants in the dairy, which are noted for their excellent fore udders and strong constitution, and these peculiarities are as strongly developed in the Rioter or Stoke Pogis family, being almost abnormally developed in the great St. Lambert cows.

There are about thirty cows similar in breeding to Mary Anne, averaging 20 pounds per week.

We will now take the queen of the dairy, Landseer's Fancy, a cow that has given the largest authentic yearly butter test.

The test began January 26, 1885, when past twelve years, and was finished January 26, 1886, making 111 pounds, 15½ ounces in thirty days, 206 pounds, 9 ounces in sixty days, 302 pounds, 15 ounces in ninety days and 936 pounds, 14¾ ounces in a year. She dropped a healthy calf June 29, 1885, about the

- **LANDSEER'S FANCY, 2876....**
  - Landseer, 331....
    - On Island of Jersey.
    - Dazzle, 379, Imp.
  - Young Fancy, 97..
    - Gen. Grant, 47...
      - Gen. Scott, 46....
        - Splendid, 2, Imp.
        - Sue 2d, 65.
      - Palestine, 26, Imp.
    - Fancy 2d, 95.....
      - Gen. Scott, 46....
        - Splendid, 2
        - Sue 2d, 65.
      - Fancy, 9, Imp.

middle of the test, and was again bred Sept. 29, 1885, so she carried a calf during nine months of the year's test. Her usual feed was four quarts of corn hearts and two quarts of bran.

Quality of Milk.

The ratio of milk to butter was 5 7-11 pounds of milk to one of butter; 2⅝ quarts of milk made a pound of butter.

The dam of Landseer's Fancy was inbred to Splendid 2d, whose daughters were not generally tested except for quality of milk, some of them producing a pound of butter from less than four quarts of milk, when fed the ordinary rations of that day. Splendid was doubtless the richest bull ever imported, and his quality is fully demonstrated in Landseer's Fancy, and many other noted cows.

Imported Dazzel and Fancy, were noted for remarkable richness, so this queen of cows was produced by a union of animals whose strongest characteristic was *quality* not quantity, which was intensified in her, and, her performance as a butter producer, considering the small quantity of milk given by her, has astonished the dairy world and provoked no end of comment as to its correctness.

For the week ending July 22 the milk weighed 152½ pounds which made 29½ pounds of butter, a fraction over 5 pounds of milk to a pound of butter.

This is one of the most striking results of intelligent effort in breeding for a specific purpose, what wonderful cows may be obtained by uniting animals having the same qualities in a superlative degree. When we see how freely the animal kingdom responds to the will of man it seems as if nothing was impossible of accomplishment to him who persistently and intelligently works for it.

DISCUSSION.

THOS. CONVEY—I would like to ask Mr. Hacker if the best cows there have not had the largest number of outcrosses?

MR. HACKER—I remarked before that we have no knowledge of the breeding of those two animals.

GEO. MCKERROW—Hasn't inbreeding reduced the size of the Jersey?

MR. HACKER—The Jersey is a small cow, that is a fact; but I am not satisfied that the cause lies in inbreeding for this reason, there are two islands side by side in the British Channel; the Guernsey has been as much inbred as the Jersey and yet she is a large cow; I think she will average the size of our native cows, if not larger. I am of the opinion that the small size of the Jersey is occasioned more by precocious fecundity or early maturity. As a rule she drops a calf when she is two years old, and from that time she neglects herself and throws nearly all that she consumes into the udder.

GEO. MCKERROW—Landseer's Fancy and Eurotas are better cows than their dams and grand-dams; now why are they better? Is it not from the fact of the outcross?

MR. HACKER—Judging from results they are better, but I am hardly prepared to attribute it to the outcross. That might be the case. I have a theory about that and I will give it to you. I believe that inbreeding intensifies the nature; I believe that it devolops the nervous temperament, and I am of the opinion that it makes the animal more delicate.

GEO. WYLIE—Isn't it pretty generally conceded that, outside of breeding Jerseys, the tendency of breeding in and in is to weaken the constitution, and that the tendency is towards disease and barrenness in animals bred in that way?

MR. HACKER—I could only answer that outside of the Jerseys from reading.

GEO. WYLIE—Isn't it so with the Jerseys?

MR. HACKER—No, sir, inbreeding does not produce barrenness. We have nothing to indicate it at all. This idea that inbreeding causes barrenness is caused by the inbreeding of Shorthorns. But they have a different temperament and inbreeding will not produce the same results on them. A rule that will apply to Shorthorns and beef animals or to a hog will not apply to a dairy animal.

W. H. COLE—In raising dairy animals what feed do you think best calculated to develop their dairy qualities, and do you think it a disadvantage to give them milk after three or four months old?

MR. HACKER—I have fed mostly ground oats to young animals. I never allow them to lay on flesh, for it has been my experience that allowing a heifer to do so, ruins her for a first-class dairy or breeding cow. So far as feeding milk is concerned, I think it better to feed milk until five or six months old.

H. C. THOM—Do you ever feed dairy calves whole oats.

MR. HACKER—I generally do feed whole oats; they are better.

C. I. BRIGHAM—Is there any danger of pampering a cow? Danger of taking too good care of them and causing them to loose their ruggedness?

MR. HACKER—My experience is that a cow should be pampered from the time she comes in until she dies.

GEO. WYLIE—Would you advise farmers to inbreed in the manner that you have mentioned?

MR. HACKER—I would not. Not to that extent.

R. B. BROOKS—What is the effect of breeding from immature sires?

MR. HACKER—Immature sires will not as certainly transmit their good qualities as mature sires.

GEO. WYLIE—Why would you not have farmers inbreed?

MR. HACKER—Because it is not likely that they will read an animal as thoroughly as a breeder will; they will not see the defects and consequently it will not be as safe.

GEO. WYLIE—It wouldn't be safe to tell a farmer that he could not see the defects of an animal as well as you can

MR. HACKER—I thought I knew somethink about Jerseys a great many years before I did know anything about the subject.

JOHN MARCH—Should a cow be fed grain before calving? Oats for instance.

MR. HACKER—From the time that a cow is dried off I would feed her lightly on non-carbonaceous feed, until about a week before time and from that time I would give, in addition to her regular feed, a little ration of oil meal.

WELDON VAN KIRK—How long should a dairy cow go dry?

MR. HACKER—That depends altogether on the dairy cow. There are some dairy cows that it will injure to go dry at all, but as a rule a Jersey cow will do better by having four weeks' rest than she will if milked throughout the season.

EVENING SESSION.

IS IT NECESSARILY HARD TIMES FOR GOOD FARMERS?

By C. R. BEACH, Whitewater.

Do We Receive Fair Returns.

"The fault, dear Brutus, is not in our stars, but in ourselves, that we are underlings!"

I shall not, in the short time allotted me, attempt anything like a full and philosophical discussion of this question, but shall confine myself to a very limited inquiry as to whether the farmers of Wisconsin get a just proportion of the world's wealth they are helping to create, or in other words, are we as farmers receiving fair returns for capital invested and labor performed and if not why not? And whose fault is it?

This is a question of facts and not theory.

A False View.

There are those who claim to believe that the farmers are a much abused class—that all the rest of the world have conspired together to rob them of their hard-earned dollars—that virtually they are the slaves of capital.

That the banks, the railroads, the manufacturers, the merchants and the middle men, are taking the lion's share of the accumulations of labor, leaving to the farmer only a bare pittance to supply his most pressing wants, and to pay taxes.

That the government both state and national, legislate mainly in the interest of large capitalists—that the interests of the farmers are almost entirely ignored, save that now and then a few crumbs are thrown to them, to save or to win votes.

If all this and much more that is preached were true, and I believed it, I would quit farming and engage in some other occupation; for I should carry about with me a feeling of degradation, a want of self-respect, did I belong to a class that was not in every sense the peers of any other class. No man can do his best in any business in which he thinks the odds are against him.

But it is not true.

Pleasant Homes, Fine Farms and Good Stock.

Go where you will throughout the state, you will find hundreds and thousands of men the owners and cultivators of highly improved farms, equipped with all the modern appliances of improved farming. Stocked with good cattle, housed in spacious and comfortable barns, the farmers themselves living in almost palatial homes, furnished with soft carpets, elegant furniture, well filled libraries, music to charm the ear and paintings to please the eye and delight the fancy.

They drive fine horses, and ride in fine carriages and wear good clothes.

Should you ask them how they came by *all* this wealth, and they will almost to a man tell you that they came to this state poor, and all that you see about them is the honest product of legitimate farming; that aside from what you see about them, they have raised and educated children, helped the boys to money to start in business, given marriage portions to the girls, helped to build roads, school-houses, churches and public buildings, contributed to the support of religion and the countless benevolent objects whose aim is to make the world better.

No Depression in Good Farming.

A business that has enabled these men to accomplish such results in spite of governmental disfavor, of legalized frauds, of crushing monopolies and unholy combinations in the form of trusts, must of itself be good business. You may go into any city or village in the state with from two to five thousand inhabitants, say Platteville if you please, can fifteen or twenty of the business men in that place buy out an equal number of the best farms in the surrounding county? I think not.

Do you hear of one farmer failing where you here of ten merchants or manufacturers making assignments? Do you know of a single instance where a temperate and industrious man who has run in debt for a farm? I care not, if it be for the whole purchase money, that has had it sold from under him unless from unforeseen misfortune? I have lived in the state for more than thirty years and I have never known such an instance.

Walworth County.

As a further illustration of the favorable pecuniary condition of the farmers of Wisconsin allow me to refer to Walworth county, where I reside. This county has a population in round numbers of 28,000. The assessed valuation of the whole property of the county in 1888 was $15,552,005, if this assessment was made upon the basis of 60 cents on a dollar the real value of the property would be $25,920,000 or $925 for every man, woman, and child in the county.

But there are 19,000 residing on farms to 9,000 residing in cities and villages, and figuring upon the same basis, the property of these 19,000 on farms is equal to $1,025 to each individual as against $716 for each of the remaining 9,000 who live in cities and villages.

The farmers of Walworth county certainly have their share of the wealth that has been accumulated. As compared with their neighbors, their property may have been assessed relatively higher, but it was not assessed for more than it was worth. Only last week I took dinner with a farmer past middle life and I asked him this question that has been given me to answer:

Is it necessarily hard times for good farmers?

His reply was, it may be a little close for some, but not more so than for men in other branches of business.

Farming Does Pay.

Farming, said he, is the surest and best business in the world, and if I was to live my life over again I would be a farmer. This man commenced for himself with nothing and by running in debt for land. Fourteen years ago he was the owner of a farm that sold for $12,000. While looking for a more desirable location, he made a few successful speculative ventures on a board of trade, the result was that before he stopped, he lost all that he was worth save a few hundred dollars. But without whining, he and a grown-up son, for the next five years worked other peoples' land on shares, for the last seven years they have worked lands for which they have been in debt for a large share of the purchase money. Today they could sell and be worth $12,000 to $15,000, all the fruit of farming. Has not farming been good business for them?

Result of German Economy.

Across the fields from my home lives a German who some dozen years ago was working by the month. He married and worked his employer's farm for seven or eight years. Two years ago he bought the farm where he now resides for $8,000, and had money to pay half down and own his tools, teams and stock enough for the farm, and in a very few years will own the farm clear, which with the working capital will be worth $10,000.

I might multiply such instances by the hundreds but time will not permit.

Good Farming Pays.

But what per cent. do farms in Wisconsin pay on their "selling value?" There are so few farmers that keep a debit and credit account with their farms that it is somewhat difficult to obtain sufficient data to answer only with approximate certainity.

But it is much larger than is generally claimed, and fully equal to the average of business ventures. I have inquired of several men, some of whom rent farms on shares, and others that receive money rent, and they will range from 4 to 7 and 8 per cent.

But the object of this paper is not to so much determine the rental value of good farms, but rather what returns may reasonably be expected from lands well managed by the owners.

For I pray God the time may never come when any considerable part of Wisconsin soil shall be owned by others than those who cultivate it.

At a farmers' meeting held at La Crosse last month this question was discussed at some length. A Mr. Harris thought that a majority of good farmers were making 7 per cent. on their investment. Mr. Hanchett said he could make his farm pay 10 to 12 per cent. Henry Richmond kept a set of books and knows just what his farm has paid, and said that it was more than 6 per cent. and that he had bank checks to show for the money.

Not far from me lives a man who owns and works a farm of 120 acres of about an average of farms in fertility.

While he makes the production of milk a leading business he can hardly be called a specialist. His cows are of no particular breed and while they are well-kept they are not crowded. He raises some calves to keep his dairy good, raises one or more colts each year, sells some grain and now and then a beef.

I have his statement of his farming for 1889; this statement, though not very minute, is sufficiently so to get at approximate results:

INCOME.		
Milk from 22 cows taken to factory......		$852 63
Calves sold.........		22 00
Hogs		190 00
Cows sold, whose place is supplied by heifers		187 00
Thirty bushels of wheat..........		24 00
One hundred bushels of potatoes........		25 00
One three-year-old colt..........		165 00
Beef..........		30 00
One old horse..........		45 00
		$1,590 63
DEBT.		
Hired help..........		$125 00
Use of tools, fence repairs, blacksmithing		100 00
Taxes		50 00
Bran purchased..........		200 00
Capital in farm at $60 per acre, 7,200 Stock and tools 2,800	$10,000 at 7 per ct.	700 00
		$1,175 00
Balance		$415 63
Use of home, fuel, provisions raised on farm for a family of six persons, use of horse for boy and girl attending high school		400 00
		$815 63

This $815.68 will more than pay the owner and his wife for their work and that of his son who helped milk and made himself generally useful. I have not given this statement because there is anything remarkable about it, but rather because there *is not*. This man has done no better than very many are doing, and no better than any of us could do. If there are common farmers with ordinary methods who can realize 7 per cent. on land valued at $60 per acre, it is certainly fairly good business.

The Necessity of Keeping Farm Accounts.

The trouble with the most of us is that we do not know anything about what our farms do pay. And even if we do make estimates there are many items that we fail to credit to the farm that properly and justly belong to it.

Let us suppose a man with a family of six persons, wanting a home, purchases a farm of one hundred acres of land, within three miles of a railroad town at $70 per acre, with good buildings, the use of the house for a home would be worth $150, fuel from the farm $50, the milk, the butter, the pork, the eggs and the poultry, together with the vegetables for use in the family $150, use of horses aside from necessary work on farm, $50, making $400. Almost six per cent. on the whole investment. But you will say, they form no part of an income. True, but they would form a very important part of one's out-goes if they had to be paid for.

The Farm a Good Investment.

Money in a farm at 5 per cent. is as well invested as money loaned at 7 per cent., for one does not need to be looking for new places to invest, and then there is always a reasonable prospect that land well located will advance in price. It is better than railroad stock. Mr. Blackstone, president of the Chicago & Alton railroad is my authority for saying that of 650 railroads companies in the United States, only 83 paid dividends to stockholders in 1888. Of these only nine paid 10 per cent., seven, 8 per cent., fourteen, 7 per cent., twenty-four, 6 per cent., and the remaining nineteen paid from 1 to 4 per cent.

That the entire railway stock in the country paid only 62-100 of one per cent. in 1888 with an increase of traffic of more than 14 per cent., the divisible profits were reduced 12½ per cent.

Real Estate Better Than Railroad Stock.

Of sixty-two railroads in Illinois forty-nine paid no dividends and thirty-six did not receive money to pay expenses. You will say that much of this stock was watered but it is not to be presumed that there was six parts water to one of value. The railroad commissioner of Nebraska says that the railroads of that state could be duplicated for $16,000 per mile but admits that on that valuation they have not earned seven per cent. I think then that I may safely say that capital in farming pays as well as railroad stock. And so with capital in manufacturing though it may pay ten per cent. or twenty per cent. on the *investment*, if for any cause the article manufatured ceases to be in *demand* or the price reduced by *successful competition* the profits may entirely disappear and the stock become worthless. A bank's stock may pay twelve per cent., but the security of the investment rests solely on the sagacity and integrity of those who manage it. I have a friend that owned stock in an eastern bank that was worth 130 cents on a dollar, but in two years the stock was worthless and the stockholders were assessed 100 cents on a dollar to pay losses.

The reason that a farmer can not hope to make a million dollars out of his business, is because it can not be carried on profitably only within narrow limits; within that limit it may pay a better per cent. than a business that yields a million dollars of revenue.

The Secret of Large Gains.

Phil Armour in his statement before the United States senate committee in reference to the pressed beef trusts, claimed that his average profits on 340,649 head of cattle stamped and sold in the pressed beef trade in 1888 was only $1.22 per head, a sum less than Hiram Smith realized on a single tub of butter, or Theo. Louis on a hundred-pound pig—yet he made a half a million of dollars. The real danger from great combinations of capital is not that they will increase the cost of production, but rather that from economical combinations, of money, machinery and labor on large scales, competition in a small way will be destroyed, and so large numbers who would otherwise be independent producers, masters of their own business, must either seek new fields of labor, or become the hired employes, and so the servants of great monopolists. The Standard oil trust, the greatest monopoly in the country, makes oil cheaper rather than dearer.

Cause of Low Prices.

But to come back to our subject. While it may be generally admitted that farming in the past has been fairly remunerative there is a wide-spread feeling that the present low prices of farm products is but the natural results of causes that have long been at work and are still working, and that there are more reasons to expect lower prices rather than higher. That by the rapid extension of railroads and steam navigation the ends of the world are brought together that space has been almost annihilated.

That the invention and almost universal use of the self-binder and steam thresher, together with numberless appliances for increasing the production of food materials with lessened labor, together with opening up of vast areas of new territory of virgin soil and unsurpassed fertility, on the continent in Australia and in Asia has resulted in an over-supply of the markets of the world with wheat, and to some extent with meat, and the prices are, and will continue so low, that in all the older countries they can be produced only at a loss.

The American Farmer not Alone.

That farming in Great Britain has become unprofitable, that during the last twenty years the shrinkage of value in England and Wales alone of farming lands and capital used in cultivating them will amount to $5,000,000,000. That the price of farming lands in New England, and New York have depreciated nearly one-half, and that even here in Wisconsin many of our farm products go begging for a market at prices below their cost of production.

Business Methods and Cheaper Production.

To all this and much more than can be said in this line I will only answer that the tendency in all departments of human industry is towards cheaper production, and that the farmer must keep step in the changing order of things or get left. Is there any reason why we as farmers should be able to buy a self-binder, a lumber wagon, a covered carriage, a shovel, a pitchfork or a hoe, a pound of sugar, a yard of factory cloth for half the price of twenty years ago without a corresponding reduction in the price of what we have to sell?

What is the object of a department of agriculture, of experimental stations, of appropations for scientific investigation as to economical methods of producing crops, of feeding tests to determine how to get the best results from a given amount of feed?

Of appropriations for farmers' institute if all these are only to result in putting more money into the farmers' pockets and not at the same time lessen the cost of food to the consumers?

Old Ways, Poor Crops—Unprofitable Cows Must Go.

But can the Wisconsin farmers at present prices get pay for his labor and fair interest on his capital invested? That depends upon how he farms, and in what shape he sells his products. If he follows old ways and manages so as to raise only poor crops sells hay, straw, corn, oats and barley, lean cattle and hogs, ill-bred horses and poor butter, I answer, no.

But if he farms intelligently so as to make every acre produce a fairly good crop and feeds it on the farm without waste in such a way that it goes to market as a finished product of the highest quality, I unhesitatingly answer, yes.

It may be that Wisconsin can not compete in wheat growing with the Northwest, and it is fortunate that she can *not*, or with the Southwest in raising cattle; but in products that require intelligence and skill, the odds will be in her favor. In the production of butter and cheese we can hold our own as against the world.

I have shown you a case where an ordinary patron of a cheese factory realized more than 7 per cent. on sixty dollars per acre, even at last year's prices—but on farms well adapted to grass and corn, with good butter cows *winter* dairying —and a silo—a return of 10 per cent. on $100 per acre, would not be extraordinary, provided the requisite amount of skill and intelligence was applied. Such dairymen are not complaining of hard times.

Profitable Industries.

A *twin* industry in connection with dairying is the making of pork. An acre of clover pasture in connection with dairy slops and wheat shorts, supplemented with corn and fed to well-bred hogs, even though sold at $3.50 per hundred, will pay more than the interest on a hundred dollars per acre, provided always that the requisite amount of skill be employed. With our clover, corn and dairies, we can beat an exclusive corn country in making cheap pork.

No state in the Union is superior to Wisconsin for raising good horses. It is not an unusual occurrence for a well-bred, good sired draft colt to sell for $150 to $200; in *raising* such *colts* there is *always profit*, and so with good driving horses—but more than half of *us* who raise such horses, still continue to raise those that have to be sold for less than a hundred dollars if *sold* at *all*.

The raising of mutton sheep and early lambs for market, when intelligently pursued, can be made to give profitable returns.

Dairying, pork making, horse raising, mutton and lambs for market, summer feeding, steers with grain on pasture—any and all of these can be made to give large and sure returns.

The conditions are that we make our products of the very best quality. That we study our business and then put the best that is in us, into it; fail we so many of us—I might say *all* of us, in so many ways, in doing as well as we know that the wonder is not that our farms pay so poorly but that they pay so well.

Yield, an Important Factor.

Do any of you realize how far we come short of making our farms produce what they might? Only last season in the state of South Carolina on a poor worn-out *soil*, an acre of land was made to produce 255 bushels of shelled corn, and 24 tons of fodder.

A woman in New York raised a crop of potatoes that yielded at the rate of 1,061 bushel per acre. I do not say that we ought to beat these records, but they show how far we come short of knowing the possibilities of production. How much we lose in failing to save in the the best possible manner what our farms have produced. How much we lose in failing to feed in such combinations, and in such a way and at such times as will give the best results. And more than all, how the best of us could double our profits if every animal on the farm was of the higher type of its kind.

More Thinking and Less Muscle.

If we have failed in any particular it is not because we have not worked enough, but rather because we have worked too much, and thought too little. In the past, muscle has been the prime factor in production. In the future it must be skill, clear thinking, and wise planning, if the scales are to indicate a balance on the side of profit, and they will if we do the right kind of thinking. We cheat ourselves in so many ways it is no wonder that we think everybody is cheating us.

The way to reform the world is to reform ourselves. The way to make the world respect and honor us is for us to respect and honor our calling—making it what it should be, the most useful, the most honorable and the most profitable in the whole range of human activities.

FOOD ADULTERATION.

BY H. C. THOM, Dairy and Food Commissioner.

Cheaper Food.

Unconsciously the nation has drifted into a partial recognition of fraud by a tacit permission to certain manufacturers to conduct a business not strictly in accord with honest principles. Manufacturers and merchants are not alone at fault in this matter of compounding food stuffs so that the original is degraded and cheapened. A cry has come from the people for cheaper food, not fully understanding that the demand could not control the cost price. As is usual in these matters the demand was dictated and urged by the apparent and alleged need rather than by mature judgment.

Fraud! Fraud!

The inherent honesty of our people when besieged by popular voice and assailed by the clamor of thousands often wavers and sometimes falls. The result is that the table of the banker, like the table of the wage worker, is burdened with fraud which represents the cunning of the serpent in the garden, and the seething compound in the witches' kettle. Nothing seems beyond the inventive genius of the imitator. The russet color is blazoned upon the yellow orange. Briny drops and butter texture and flavor appear in oleomargarine to the utter consternation of the honest herdsman and the patient cow. New Orleans molasses springs as readily from corn as from cane. Jellies are as readily expressed in December, in the back room of a canning establishment, as from the red cheeked plum in July. Meal passes for pepper, turnips for horse radish, chicory for coffee, red pepper for ginger, plaster Paris for cream tartar, and alum for baking powder. Beer glass washings ferment to cider vinegar quicker than from the penciled Tallman Sweet. Even smoked halibut is sliced from the ham of a dead sturgeon. Need the list be continued? We are a patient and long-suffering people. Are we not becoming a race of short lived people as well? Is it strange that wails rise to Heaven from the dentist's chair, and that the fires go out in the engines of our bodies, and that our stomachs put on their night-caps and fall asleep to wake in a land where the necromancer is unknown?

Our Resources.

Wisconsin is a broad and fertile state capable of producing more than enough to keep in comfort her two million people. To our native born have been added representatives of all earth's nations, contributing to our prosperity with their industry, frugality and intelligence. Our people have made homes of comfort and elegance. Wisconsin legislation has equipped health departments with license and authority. Millions are annually expended in sewerage and drainage. Health inspectors are tirelessly tramping through garbage alleys and miasmatic districts. Contagion is fought with science. Midnight processions glide silently by the homes where disease has found no foothold. Glandered horses are shot and burned to ashes. Pest houses are a public necessity. Every township, every village, every city, have watchmen to guard the health of their people. At any cost this must be done. Every house has a family physician. Every one is living a life of sacrifice that his general health may be better. This man denies himself coffee, that man shakes his head with a sigh at the proffered cigar, and another swears off on his morning dram. Why, every morning we say, "How are you?" meaning, what is the condition of your health. What is this thing we guard so jealously, that we are so anxious about, that we spend wealth so lavishly for? It is life. Aye, health is life. With loss of health comes loss of temper, with loss of temper comes loss of content. Feeble brains and an infirm body make a good match, and go halting round the track of life together.

Adulteration.

Despite all the precautions taken, modern civilization is threatened by an insidious foe which enters every home; a foe born of the greed of gain, a foe whose name is a household word, so common, that, like the tick of the old clock, we heed it never. We are all its victims. Its name is Food Adulteration.

Until recently no protection has been given society against the use of a great number of substances, furnished by unscrupulous dealers, although investigation has shown them to be pernicious to general health. I quote Dr. Beckwith of the Ohio Board of Health: "The use of alum, for instance, in bread making is a common practice in this country and Europe. We will admit that no symptom of poison is evident from a single small dose of alum, but it is a well known fact among medical men and scientists, that in large doses it acts as an irritant poison, and that it has, in numerous well authenticated cases, produced death.

Health and Safety.

"It remains for this enterprising age to raise the subject to a destructive science. In the matter of teas, coffees, spices, syrups, sugars and other articles in daily use, short crops or sweeping changes in import duties do not trouble the consumer in the least. The beneficent manipulators of these goods take the import and bring the supply up to the demand in their own ware-houses." Laws are very stringent upon this subject in Europe, particularly in France and Germany. America, which has but recently passed laws regarding the matter, has been in a good position to catch the spurious goods from the old world which they could not sell at home. My friends, we refused to take tea from a foreign port once upon a time; are we not as independent now as then?

Wisconsin contrary to her usual custom did not lead the van to reform in stamping the fraud of adulteration as amenable to the criminal code. New York, New Jersey, Ohio, Minnesota, Iowa and other states have taken great strides in this direction. New York instituted 265 cases last year and collected nearly $9,000 in fines. Thirty-five per cent. of milk tested in the state of Minnesota in 1887, was below grade. Only 2½ per cent. of milk tested in the same districts in 1889 was below grade. In 1888 sales of foreign cheese in Minneapolis was 727,000 pounds; state cheese, 582,000 pounds. In 1889—sales, foreign cheese, 394,000 pounds; state cheese, 1,456,000 pounds.

Let Us Have Pure Goods.

This radical change was brought about by enforcement of the law relating to the handling of pure goods. It is the aim of every state to protect the interests of her people. Four or five million pounds of oleomargarine are used annually in Wisconsin. This means the product of 30,000 cows. It means that 6,000 farms are deprived of profit and fertility that would naturally come from 30,000 cows. It means that 30,000 heifers remain unborn or are killed at birth. It means over a million dollars handled by manufacturers outside the state instead of farmers within our state who help bear the burden of taxation. No man can live in a business sense and place his butter in competition with tallow and cotton seed oil, so manipulated that it requires an expert chemist to detect the difference between the compound and dairy butter. It is not clear that we should prohibit the manufacture of any mixture that is not injurious to health, but we should strip oleomargarine of its power and that can only be done by obliging manufacturers to make it look like itself and not like butter. Butter has worked all these years to make for itself a market and a demand. Now that they are established it should not be robbed by an imitation. The attack has but just begun. No corner of the state is too remote for its presence. No table so humble, no dining room so grand, no lumber camp so rough, that oleomargarine, with its mellow name, will not walk upon and into, with a deceitful bow and brazen smile, with the claim that its name is butter.

Our Dairy Resources.

600,000 cows, patient and gentle, graze upon Wisconsin pastures. $18,000,000 are invested in them by Wisconsin herdsmen. Are we to allow a Chicago corporation to drive our flocks from the fields and force men into business they are not fitted to by birth or training? It is not justice. It is against all ideas of right. The day is near at hand when public sentiment will demand recognition. No man or company of men have the right to stand in the light of a great and common interest. Shall the people and the legislature of Wisconsin show themselves more friendly to a Chicago fraud than they are to a Wisconsin industry? The legislature of 1889 said "No." The honest consumer says "No." We need more perfect laws on this question and I believe the sentiment of the state will be found solidly in favor of their enactment. The bone and sinew which has made Wisconsin a peer among her sister states will crush fraudulent interests to earth. When we consider that the welfare, the contentment and the prosperity of our nation depend upon the health and profitable industry of its people, these benefactions should be protected by decisive action and energetic discipline.

Adulteration—Poison.

Half the babies die before they reach the age of three years. Many undoubtedly are hurried to their tiny graves by adulterated milk. Righteous indignation should put a man in stocks who would dole out a thin excuse for milk to the puny child whose mother is too ill and weak to supply it proper nourishment. The greed of gain warps men's souls. A day of judgment is close at hand, and a righteous Father will hold them to strict account and demand full measure. The little band of men who first conceived the Dairy and Food Commission saw clearly the finger board which marked the road along which unscrupulous gain was hurrying men. A halt was called. The momentum of the crowd is great. We had looked too long at the hustling procession with sleepy eyes. No man heeded the cry, but the voice is imperative and must be obeyed. The department is simply one of enforcement. The state has no use for laws that are not administered.

An Honest Business Usurped.

A business that has displaced 25 per cent. of legitimate production requires time to check. No state department can reach its utmost efficiency without the hearty co-operation of its citizens. I appeal to every honest merchant, every honest manufacturer, every economist, every honest farmer to join in the lists against the usurper of honest profits and the destroyer of human life.

To most of us it matters little whether death ensues from a large dose of poison, or from the cumulative effects of many small doses. To the philosopher the former is greatly to be preferred.

Wisconsin produces 50 million pounds of butter at 16 cents per pound, which is $8,000,000. Wisconsin produces 40 million pounds of cheese at 8 cents per pound, which is $3,200,000. The product of butter and cheese sells for $11,200,000. Eleven million two hundred thousand dollars of the farmers' money is trembling before the onset of fraud. One-eighth of the total butter product is displaced by oleomargarine to-day, and the fight has but just begun.

Results of Dishonesty.

Two weeks since a circular came to my hands in which the name of Wisconsin was held up in shame before the whole world because she put into the markets of the world fraud cheese. The Consul of America in England writes Secretary Blaine that Liverpool docks are covered with spurious cheese from Ohio, Illinois, and Wisconsin. Committees were appointed to investigate and I was obliged to write the chairman that a few men, and I was obliged to add, some of them farmers, were willing that the fair name of Wisconsin should be trailed through the mire of dishonesty and infamy for the sake of a few paltry dollars. To them—a few hundred dollars—to the state, the loss of millions, and the gain of a tarnished name. Busy Chicago commission men were seen the other day scraping "Wisconsin" from the cheese boxes so that the word would not spoil a sale. Men who bring this about are unworthy the name of men. Honest men stand ready to cheer Wisconsin to the echo. In my judgment they stand ready to throttle a fraud that threatens to lessen their loyalty.

A FEW PLAIN THOUGHTS ON THE PRESENT AGRICULTURAL DEPRESSION.

By GOV. W. D. HOARD.

LADIES AND GENTLEMEN:—The world is full of doctors and whenever there appears a patient the aforesaid doctors have any number of diagnoses to offer for the cause of the disease and prescriptions for its cure. Agriculture is at present in a somewhat depressed condition. The profits of it have been lessened. You have listened this evening to a very clean-cut and philosophical essay from one of the most practical farmers and best thinkers in Wisconsin, Mr. Charles R. Beach, who gives you from his standpoint as an intelligent farmer, some good thinking upon this matter. No matter what may be the conditions that attend men and their effort, all solution of difficulty must first come from the standpoint of thought. Human thought is like a calcium light directed upon the facts to disclose their proportions, their relations and our relations thereto. Common sense must be the great solvent of all our difficulties. What is common sense? It is the widest understanding possible of the relation of common things and our relation, if you please, thereto. We are surrounded by a complete environment of common things. As a consequence the best wisdom that we can get and the most of it concerning the laws that govern these things will be very much to our own profit.

A great many people in this country are looking up into the air for the solution of every difficulty. They are praying to a god in the distance and never to the Maker who is close by them. That is in a certain sense as true today of the agricultural mind as it is of everything else. I notice that a thousand farmers are directing their eyes to Washington for relief from agricultural depression, where one is looking to his own effort and his own understanding for that solution.

Misdirected Effort.

Now it has struck me that there is a reversion of intelligence in this matter, and I have a few facts to offer you. I have but little faith in legislation taking hold of agriculture and effecting much if any relief; I believe that what ails the farmer is what ails me in my business, which is partially that of agriculture, relating to the manufacture of agricultural products, and that is this: that if I do not obey the laws of success, if my efforts are misdirected, I must pay for it and there is no hope for me in any legislation or in any effort of my neighbor. Therefore the question of *misdirected effort* is a pertinent one to Wisconsin agriculture today. Are we engaged in misdirected. effort, are we wasting our resources, are we earning to waste and not to save? This will be the scope of what I have to say.

Armour & Co. lay down one class of beef in Cleveland for five and one-half cents a pound, by the carcass, and another class or grade at eleven cents. Yet ten of the first grade are produced to one of the latter. Can congress pass any law that will make five cent beef sell for eleven cents? If the law cannot change this state of affairs, who but the farmer must change it?

Over-Production of Inferior Products.

In 1880 we had 35,000,000 of cattle; in 1889 we had 57,000,000; our population has increased 13 per cent. but our beef cattle have increased 62 per cent., if these figures are correct. But the increase is largely in the inferior grades where there is no profit in production. Who makes these unprofitable cattle but the farmer? Will any state or national law change him over to a good farmer?

Millions Lost.

In Wisconsin we produce about 50,000,000 pounds of butter; 10,000,000 pounds sold last year as near as can be estimated for an average of about 23 cents a pound; 40,000,000 sold for an average of about 13 cents a pound. Do you know of any earthly power but the farmer himself that can change this poor 13 cent butter to 23 cent butter?

Competing Against the World.

We have shipped as high as 226,000,000 bushels of wheat to England in wheat and flour in one year. Now we exporting 100,000,000 bushels. England took and now takes, all of our surplus wheat. Russia within ten years has reached an English export of 118,000,000 bushels. India last year supplied England with 54,000,000 bushels. Mark how small a thing has worked a great result. A decrease of 78 per cent. in the cost of jute bagging has made the India export possible. India ships all of her wheat in bags, and a decrease in the cost of the jute bagging made it possible to dump 54,000,000 bushels of her wheat into the maw of English consumption. Austrian-Hungary gave England 18,000,000 bushels last year. The Argentine Republic sent 9,000,000 bushels. All these nations have taken the English market away from the American farmer in ten years to the amount of 125,000,000 bushels of wheat. England being the only country that buys wheat and these outside countries being willing to lay wheat down in Liverpool at one dollar, the Englishman will not pay us any more than what he can buy of other folks for. He has never yet been known to sacrifice himself in behalf of any other country.

A bushel of wheat in Madison is worth 72 cents. It costs 21 cents to lay that down in Liverpool; wastage is 2 cents, insurance, commissions and elevator charges are 5 cents; add this to the original 72 cents and you have one dollar. Wheat was selling last week in Liverpool at $1.02 a bushel, and yet Wisconsin farmers are preparing to sow more wheat. In 1882 English farmers raised four million acres of wheat, but this outside competition has so reduced that acreage that in 1889 it was only two and three-quarter million acres. English wheat sells this year in England at the Exeter market at 90 cents a bushel. Russia has today a surplus over the foreign demand of 18,000,000 bushels of wheat. Were it not for the duty of 20 cents a bushel, Russia would unload her surplus in the American market.

Our National Crop.

We raised in 1889, 72,000,000 acres of corn producing two billion one hundred and fifty-six million bushels. England and the continent only want one hundred million bushels, leaving one billion fifty-six million bushels in our hands. Fifty million acres of corn fodder are about the same as wasted. One acre of corn and fodder in a silo will feed a steer a year. In Ohio on high priced land it cost $12.25 an acre to raise and silo one acre of corn, allowing three dollars as interest on the land per acre. Those fifty million acres of corn if theyhad been handled economically, would have fattened fifty million beef cattle. On the contrary one-half of the feeding value of those fifty million acres was thrown away. Do you think the ranchman could compete with you in the production of cheap beef if you fairly and resolutely determined that you would take advantage of what you annually waste, and so establish profit where loss now exists?

Too Much Crude Thought and Crude Effort.

What is it that a man has to sell? Skill. If he does not sell skill, he sells to kill. Now, here is a thought which I wish were elaborated until it swelled to the size of our necessity. The trouble with Wisconsin farmers, very largely, is a lack of the sale of *skill*. Men are putting crude thought and crude effort into the production of farm products and contenting themselves with that condition, thus selling crudeness and not skill.

Lack of Skill.

An illustration: The town of Watertown is twelve miles from the town of Koshkonong in Jefferson county. The town of Watertown has the best land, and everything to its hand in the way of markets, as nicely as it could ask. In 1885 it produced 83,000 pounds of butter, which, because there was no skill used in the production, sold at an average of twelve cents and eight mills per pound. The town of Koshkonong, twelve miles distant, produced that year, 124,000 pounds of butter, which, by virtue of the use of better skill, sold for twenty-one cents and eight mills per pound, an increase of nine cents a pound. What the town of Koshkonong got the farmers of Watertown could have had. But no, they refused to pay the price of success; they paid no attention to skill. Now, what was the amount that they lost? Mind you, they had produced the butter, they incurred all the expense of producing *good* butter. They had gone to the expense of producing 83,000 pounds of butter and they lost 9 cents a pound. It amounted to $7,470 or $3.71 for every man, woman and child in the town, or once and a half more than all their taxes. There wasn't a farmer in that town but would have been willing to have gone from home to Watertown a dozen times to save his taxes. Yet for the lack of a little intelligent judgment and understanding put into the manufacture of that 83,000 pounds of butter the result was as you see it. Is there any legislation on earth that can save to those farmers the loss that they have imposed on themselves?

The Farmers' Institute.

For this reason we gather in the Farmers' Institute. For this reason do we agitate this question, hoping thereby that we may fertilize our judgment and that thought, study and intelligence shall guide and control our destinies. What do they mean? They mean hope and encouragement to the farmer, they mean hope and encouragement to his family, they mean no additional burden but additional liberation. I have seen so many instances of it. I have seen so many men who have been leavened by the use of a little thought, taking hold of their destiny and thereby weaving for themselves a condition of prosperity, and doing it within the humble purview of a little farm, that I believe more than ever that "knowledge is power." I believe, to-day, that the plain simple truth with us is that, if we work out our salvation, we must do it not only with fear and trembling, but we must do it with a clear perception that knowledge and skill is to be our saviour. These are the true solvents; here is the philosopher's stone. Education is to be for us the final solvent.

What Is Education?

Passing down the River Nipigon, way on the north side of lake Superior, I had an idea forced upon me of the value of education. I was in the hands of two Indians in a birch bark canoe, the river full of rocks and with rapids flowing, in places, at the rate of twenty-five miles an hour. One goes gliding along easily and swiftly when suddenly the river dashes over the brow of a hill and at the rate, as I said, of twenty-five miles an hour—you are precipitated down with a swiftness that appalls you. You see a rock rising as high as this building in the midst of the stream, and you say to yourself, "It cannot be in human fate that we shall escape that rock." You see yourself borne swiftly toward it. You are about to commend your soul to your Maker; you look inquiringly into the eyes and faces of those Indians to see if you can trace your destiny there. Not a muscle moves, not an indication of what they know and can do. But just at the right moment, as you reach the point of the reflex action of the water against the rock, a skillful turn of the paddle—not an unskillful one—and your danger is over and you dash by to meet another, and so on, for forty miles down the river, you find yourself constantly committed to the education and skill of those simple sons of the forest. What have they done? They have studied out *principles* which will guide them and which will bring them protection. They have studied the forces of nature. It is education in the highest sense of that word, it is education in the highest reach of the thought. It is by becoming masters of those forces that we make nature serve us as she should serve us. She never serves any one without skill. Therefore in our struggles, in all of our gettings, let us get understanding; let us learn that we must sell *skill;* that for every particle of our product that goes out crudely, that much is marked with the stamp of loss; that we must in these days become ***skillful*** farmers.

The Value of Hard, Common Sense.

Here is an illustration of the value of understanding. A dollar's worth of wheat sent to Liverpool will cost, as you see, in the neighborhood of 21 cents. Yet there are thousands of farmers who persist in subjecting that dollar's worth of hard work to that very condition. Here are two silver dollars; this is the wheat dollar in my right hand; this is a cheese dollar in the left. There are a hundred cents in each one, no more and no less. That wheat dollar pays a tax of twenty-one cents to get itself to the consumer; that cheese dollar pays a tax of seven cents; if it be butter it pays five. Now, my friends, here is one of the illustrations of the necessity of every farmer concentrating his product, reducing the crude product, that is, concentrating values and reducing bulk. You see there are but a hundred cents in each dollar, and yet the wheat dollar pays 14 cents more than the cheese dollar and 16 cents more than the butter dollar, in the simple cost of transportation. But says the farmer, "the railroads charge me too much on this wheat dollar." They may—they will if they can. But let us look at it a moment. To carry $2,000 worth of wheat in the old standard cars will require six cars. To carry $2,000 worth of cheese will require one car—$2,000 worth of butter half a car. Can a railroad company, build, equip, man and run six cars for the price of one car, or for the price of a half car? It is preposterous to think so, and, therefore, if we compel the railroads to carry bulky products for us, we must bear the punishment that that folly brings.

These are economic questions, but they reach down to the roots of our being. They take hold of our destiny, and I submit them as "A Few Plain Thoughts Upon the Causes of Our Present Agricultural Depression."

SILO SESSION.

SAVING AND APPLICATION OF MANURE.

By JOHN M. TRUE, Baraboo.

SUPT. MORRISON—I am very sorry that we have not a larger attendance to listen to the papers and discussions that we are going to bring before you today, upon the same line nearly that we had yesterday; but there is one consolation,—we are not working for this audience alone; we are working for an audience of over a hundred thousand that our bulletin will reach, and consequently we will do just as good work as if the hall was crowded.

In the absence of the governor the subject of the "Saving and Application of Manure" will be introduced by Mr. John M. Truе, who will give you a short talk on the subject, to open up the general discussion.

Saving and Application of Manure, by Hon. J. M. True.

It is always embarrassing to appear in the position of substitute for another speaker; it is especially unfortunate when one is called upon to speak upon a topic that has been assigned to such a speaker as Gov. Hoard, and this embarrassment is not very much relieved when we consider the importance of the topic that I am called upon, upon the moment, to present to you.

In my opinion the saving and application of manures upon the farms in Wisconsin represents one of the greatest leakages that our attention is called to; and while we may not be able to agree (as we doubtless shall not, at this time), with reference to the best methods, especially of the application of manures to the different soils, still there is ground that is common to all parts of the state and to all methods that is worthy of our consideration.

Save the Liquid as Well as the Solids.

When we come to recognize that it has come to be an accepted fact that the liquids in connection with the droppings of our live stock are equal at least in fertilizing value to the solids, the importance of the proper saving in our stables of the manures is seen in its full importance. Therefore, we will pass over this subject with the simple statement that a sufficient amount of bedding or absorbents of some kind should be used in the stable in order that there may be no waste in this direction. Passing from that to the handling of manure after this, I have to say that I have no doubt that under favorable circumstances, the greatest saving of fertilizing qualities of manure is obtained where they are drawn directly from the stable and applied to the land; but still there is a question yet that seems to me is not fully settled, with reference to the percentage of loss that may occur under certain conditions, depth of snow, rolling surfaces of fields to which the manures are applied, that render this uncertain whether this may be accepted as an infallible rule upon all of our farms.

Our Experience.

I propose this morning to speak especially of my own methods with reference to this matter, allowing other gentlemen who entertain different views to present the other side of the question. I have not been accustomed to draw the manure from my stables directly upon the field. Neither has it been a custom with me to remove the manure from my sheds to the fields and apply it to the soil in the spring of the year. I find that I am too busy in the spring of the year at putting in my crops to stop and apply the manure to the soil, and indeed it has been a question in my mind, during the past few dry seasons, whether those farmers that have made a practice of drawing green manure from their stables and yards and plowing it under, have received any great benefit from such application of the manure. Briefly, then, I am accustomed to piling, with considerable care, the manure as it comes from my stables, and retaining it until the next fall before it is applied to the land. I aim to use a great deal of care in the location of these piles and the manner in which they are constructed and handled. It has come to be a fact accepted by all that the great loss to manure occurs by leaching.

As was drawn out incidentally in the discussion yesterday, there is doubtless much less loss in the escape of gases from manure, even when undergoing fermentation, than is generally supposed. Not every offensive odor that is found around a manure pile represents escaping fertility.

Loss by Leaching.

The great loss that occurs to to manures before applied to the soil is from leaching, through being spread out loosely over the yard, coming in contact with those little rills that are allowed to flow through the barn-yard, or by being placed, as represented in the picture before us, under the eaves of the building where the drippings from the roof fall upon it, washing out the fertilizing qualities of the manure, from which place they are conveyed into little pools that either dry up or are evaporated or allowed to flow off into the pools in the yard, where the fertility is wasted. Then, locate the piles of manure where they will be free from contact with the drippings from the stable, and free from the little rivulets that sometimes may flow across the yard. I am accustomed in starting the foundation for a manure pile to lay it out with the regularity that I would a straw stack. I suggest that the top surface should be flat. My farm stock is largely horses, and you know that manure from the horse stable is much more liable to fire-fang, as we say, and become injured from this source than any other manure that we have around our stables.

A Compost Heap.

Keep the manure piles flat on top; spread the amount that is wheeled or drawn from the stables daily, evenly over the surface, upon which the stock are allowed to run as they will, and there is no danger of fire-fanging. I think it is a good plan to mix the manure from the cow and horses table in one pile. There is a lack of that fermentation in one case, which is necessary to produce good results, while the tendency toward too active fermentation of the other kind, has a tendency to make both kinds of manure better for the land. I think if the manure pile is arranged in the manner I have spoken of that there is very little loss from leaching. Talking with a gentleman here a few minutes ago I was struck by an illustration of this point; he stated that it has been necessary in his experience, while drawing manure from his stable and piling it up in great piles, to even throw water on them to prevent them from heating to too great a degree. If this is the case it is not to be supposed that there will be a sufficient amount of rainfall from the clouds to injure the manure from leaching.

Surface Application.

Just a word as to the application of manure to the soil. I am aware that with the diversity of soils represented by the farmers in this audience, we cannot lay down any general rule alike applicable to all—sand, stiff clay and black loam will require different applications of manure to get the best results. My soil is a black loam soil, with a clay subsoil. I want to say that, in my experience, I find I get much better results in crops and in the staying qualities of the land, by a surface application of manure. Let this manure be applied in the fall of the year, either to the meadow after the hay crop has been cut, or, if upon land I wish to crop the succeeding year—as is usually the case—with the corn field—I first plow and then spread the manure evenly over the furrows, directly from the wagon.

Wasteful Method.

I wish to speak against a method, wasteful both of labor and fertility, that seems to prevail in a good many parts of the state, of drawing the manure to the field and piling it in neat little piles to be spread in the future over the surface. It seems to me the manure can be spread directly from the wagon, and then, if it leaches, the leaching is just where we want it, in order to prepare the soil for the crop we propose to put upon it. I am aware that with a stiff clay soil, where the mechanical effect of plowing under manure is wanted, this rule may not apply. I think it applies in greater force, perhaps, than to the soil I spoke of, when the land you wish to manure is of a sandy nature.

DISCUSSION.

W. H. COLE—On soil like yours what crop do you like to put manure on immediately after?

J. M. TRUE—I apply immediately after the corn crop, and sometimes apply to winter wheat as a surface dressing.

W. H. COLE—How about pastures and meadows?

J. M. TRUE—I apply somewhat to meadows,—apply the well rotted manure after haying time.

R. B. BROOKS—Isn't there danger of taking it up the following season with the hay?

MR. TRUE—Not if the manure has become as well rotted as it will be, if it is handled in the way I suggest.

R. B. BROOKS—Do you ever plow under?

MR. TRUE—Not on my farm.

J. S. JONES—Have you ever noticed that in extremely dry seasons, when the manure has been applied as you suggest, immediately after the hay crop is removed, whether there was a tendency to draw the sun and to thus injure the grass?

MR. TRUE—I will state that I have never noticed it.

J. S. JONES—It has been my experience that it operates in that way.

R. B. BROOKS—With such dry falls as we have been having, don't you think there is waste in applying manure as you suggest?

MR. TRUE—I am aware that the idea suggested is a common one. The manure presents a shriveled appearance and looks as though it might be of less value, but when the rains fall again the same fertilizing qualities may be leached out.

Orange Judd—In your corn ground, don't you plow in the spring at all?

Mr. True—No; when I apply manure in the fall, I find that I can get better satisfaction by using a disk harrow in the spring.

C. P. Goodrich—Do you think it a good plan to apply the manure to the pasture?

Mr. True—I cannot speak from experience.

C. P. Goodrich—I apply more that way than any other. It is true that for a few weeks the stock will not crop the grass very close, but they have the rest of the field to feed on, and after two or three rains they will feed that off. I draw it out when I have opportunity in the summer time. It not only furnishes more feed, but it makes a stiffer sod to turn under.

Mr. True—How deep would you break that sod, Mr. Goodrich?

C. P. Goodrich—I wouldn't plow more than three inches deep.

J. S. Jones—Where the manure is coarse and not fit to put on the meadow, but fit to put on where you want corn, by plowing about three inches and a half deep, I think in a dry season, the corn roots going down under the sod into this manure of a coarse nature, has a tendency to hold the moisture and I think is beneficial to the corn crop.

Mr. True—I want to say that two years ago it was very dry, and I know of places where manure was plowed under then and when they plowed the land up afterward, that manure was plowed up in just about the same condition as it was when plowed under. I didn't see that it had rotted in the least during the entire summer.

J. S. Jones—Don't you think the manure has a tendency to hold moisture?

Mr. True—It would seem to have theoretically, but when turned into a dry soil it doesn't seem to practically.

W. H. Cole—I think coarse manure plowed under has a tendency to retain moisture. A good many times we have a good hard rain in the spring and then it is dry the rest of the season. If we can get the manure plowed down and wet it will retain the moisture.

H. C. Thom—If you don't get it wet you can't get corn enough off of forty acres to keep a steer.

C. R. Beach—A neighbor of mine plowed under a crop of rye and the crop of corn was almost a failure; the rye dried out and the corn was not nearly as good as it was on the field next adjoining, owing to the coarse rye being plowed under.

C. P. Goodrich—I had a little experience with corn two years ago. I put the coarse manure on in the spring and plowed it under, it dried out so I pretty much lost the corn crop, and I am not sure but I pretty much lost the manure.

Mr. True—If this soil is thoroughly wet down six inches deep in the spring there will be sufficient moisture in the soil as not to need manure to tide over the dry season, and manure would be unnecessary, and under those circumstances it would give better results to apply it to the surface.

R. B. Brooks—I would like to ask what time that rye was turned under?

H. C. Thom—I would say that Rock county had a peculiar experience of this kind two years ago. They raise large quantities of tobacco in that county and a good many put in rye that they may turn it under. They did it this year, which was a very dry year and I didn't see an acre of tobacco that grew on that kind of land. They plowed some of it as deep as eight inches, throwing this heavy crop of rye under and planted the tobacco on that seed bed; the result was that this rye which was turned into the bottom of the furrow effectually retained almost all the moisture that was below it and it was unable to come up through to the surface and the result was that that earth above the rye was absolutely dry and powdery, and they got no returns. The same year I planted twenty-six acres of corn that was heavily manured and I turned the manure under and there wasn't corn enough to swear by. I planted another field of corn that wasn't manured at all, and that bore a heavy crop.

MR. FRANCE—Had it been a dry season how much good would that manure have done on top?

H. C. THOM—The more manure on top the better, for it would answer the same purpose that the rye did at the bottom of the furrow, it would retain the moisture; turning a stone over a little piece of earth is the best thing in the world to keep the earth moist.

C. R. BEACH—Had that rye been on the surface of the ground would it have furnished a mulch that would have kept the ground moist?

H. C. THOM—It is my opinion that it would.

QUESTION—How about top dressing?

C. R. BEACH—I knew a man who put a shovelful of manure on the top of each hill of corn and all summer he was digging to get his corn hill.

VOICE—I have tried it with good results.

C. R.—BEACH—I think that manure on the top of land that you are going to plant is the very best way to apply manure, and I have no doubt that it is best to apply green manure.

GEO. VAN HOUTEN—I spread the manure on top. It is sometimes difficult to spread it just where you want it. I spread it between the corn rows, sometimes before the corn is laid by, and sometimes after, and then afterward spread the manure. In southwestern Iowa in the last three or four years we have found that manure plowed under has in many instances been a positive damage, while as a top dressing it has always given beneficial results.

VOICE—With us the old style way of plowing manure under has been altogether abandoned; we apply it either to meadows or to pastures or spread it on top; in general there is more applied to meadows than in any other way; as the manure is accumulated during the winter it is immediately hauled out on the meadow and spread.

THOS. CONVEY—I prefer to haul out directly from the barn. I know that about fifty per cent. of the manure in this country is allowed to go to waste, if it is allowed to remain around barns and in yards. The style of allowing it to remain in compost heaps is better than allowing it to lie under sheds or in yards where it is allowed to leach away. There is less loss in applying manure of the right quality to the soil and it is a saving of labor. You have more time to handle it in the winter time, and it is more convenient to haul it then. I run my cattle in sheds and haul the manure directly from those to the field—that is, of my young stock. The dairy stock are kept in the barn where there are water tight manure gutters, and everything goes directly to the field. I prefer to top dress early fall plowing for corn ground.

but cultivate the manure in well in the spring; I would prefer to have it in good condition, of course, not having too much straw in it, but yet I have failed to see any damage done to a crop by top-dressing with manure, as has been stated. Of course, if you are careless in cultivating, and don't have it well mixed up with the soil, there is a disadvantage in handling it in this way, as it dries out; but with thorough cultivation, I have not been able to find anything that gives better satisfaction than to apply the manure directly to the field and spread it as hauled. The main loss in handling manure is by leaching. All manures must be in liquid form to be available as plant food, and the leaching should take place in the field in preference to barn-yards and about the stables. I have applied manure to pastures with decided advantage. Cows will not crop the grass so closely; they do not relish it so well as where it is not applied, but the pasture will yield double the amount of feed and will stand a greater amount of drouth. The effects of manure are not as apparent in a dry season as in a wet one, of course, because the fertilizing qualities of the manure are not leached out so much, but they remain in the soil, however, and when we have a wet season then the effect will be apparent on the soil.

ORANGE JUDD—I want to call attention to the value of concentratad manure upon hilled crops and those in drills, more immediately around the growing plants. I have advocated for years the importance of growing corn, for instance, of concentrating a little well prepared manure on the hill.

MR. RUNDELL—Our usual method here is to haul out the manure before plowing in the fall. It seems to me that hauling manure on the plowed lands would be very hard on the teams in this country; they would sink in a good deal, and it would also make ditches where the water would accumulate and wash away the soil. I don't think it matters so much whether we get the benefit of the manure the first year or not; we will get it sometime; get it on the land and we will get the benefit of it sometime.

C. G. HENDY — A few years ago I had two objects in view with reference to a piece of ground—I wanted to kill some quack grass that was in it, and I wanted to get a crop of corn, and the question was, how I should accomplish both. I plowed the ground in the fall and then again in the spring. I prepared the land and put in my corn and went right to work with two teams and three wagons and manured six acres. Some of it was well rotted manure, and I supposed when I started I had enough well rotted manure to put over the whole piece, but I found I hadn't and so I applied green manure. I would never apply green manure in that way again. With the well rotted manure I had good results; where that was I had good corn. Where the green manure was, I hadn't so good corn. I had a fair crop of corn and succeeded in killing the quack grass.

T. J. VAN MATRE—I have a barn 50x70, which sits upon a basement nine feet high. A gangway passes through the middle of this barn. Above and on one side of this gangway we have room for twelve horses and five or six cows that we milk during the winter. The stock cattle are kept below in the basement. All the manure made above drops into the basement and is allowed to remain there until the fall of the year when it is hauled out. There is no leaching nor no drying out by the sun, and where we put the manure we find that one load or one ton of it is worth two or three tons preserved as Mr. True stated, where it is piled up in piles and allowed to lie during the summer exposed to the rain and sun. Usually, if we can, we put our manure on the meadow; we have experienced the best results in that way, because the tendency of manure is downward, and the nearer you can get it to the surface the better.

JAMES SPENSLEY—My farm is a heavy stiff clay soil. I have obtained the best results by hauling the manure out all the time just as fast as it has accumulated, spreading it over the ground that I intended to plow in the spring. I plow as shallow as possible, cultivating the ground and getting a nice seed bed, plant the corn and we have splendid results. Of course, I agree with all the gentlemen, that all the manure must be saved, both liquids and solids; it is necessary to have it in that condition. But the difference is in the soil. What is the best method in one section is not the best method in another. As I said before, mine is a stiff clay soil, and the application of the manure in the way I have suggested makes a fine, rich, mellow seed-bed for the seed to grow in.

T. J. FLEMING—I think the gentleman's head is level. I, like all the gentlemen who have preceded me, am of the opinion that the manurial products of our animals is a very important subject. I think it is the ground work of our success in farming. Some of the gentlemen I cannot agree with, but a couple of them I do agree with. My practice for four years in handling manure has been this: There is an alleyway between my cattle, eleven feet in width; as my stock are driven out daily about eleven o'clock to get their drink, the manure found behind each row of cattle is thrown to the center of the alleyway and permitted to pile and accumulate there for about three days. I should have stated, however, that I always use a sprinkling of land plaster and horse stable manure, which makes a combination adequate to absorb the liquids, especially the ammonia, the greatest element of fertility to be found in the manure, having a chemical value of 17 cents per pound.

There is one point in this system of handling manure which has not been brought before this convention and I think it should be. All who feed to their animals a corn ration, and I believe all farmers should and must do so, if they would have profit, will find that there is a portion of undigested corn ration in this manurial deposit. If it is hauled directly to the field you are losing the feeding value of that undigested portion. In order to govern against that I permit my stock hogs to go into the barn basement while the animals are out getting their drink, and I find they are most diligent workers, going through the manure piled there and taking out every portion of the undigested corn ration, and I then feel satisfied that that corn feed has either been converted into milk by the cow or pork by the hog. I have all of the liquids combined with the solids, and as chemists tell us that the liquids of the manure represent about 70 per cent of its fertilizing value, I believe that it behooves all of us to handle this manure so as to get this liquid portion as well as the solid on to that portion of the farm which, in our judgment, requires it most. As Mr. Convey told you it is the cheapest time to put the manure upon the land. The help which I must have upon my farm is able to do the regular routine work and put this manure upon the farm without materially affecting the other work. It is a very pleasant fact for any farmer when spring comes upon him to know that the manure has been spread evenly over the field he wants to put it upon. It is all right possibly for those men who claim they put it over until fall, but I am speaking of a great mass of people who don't do that way, but who simply let it accumulate in the barn-yard every winter, and are then forced to draw it out upon the farm at a time when time is especially valuable. The land is soft and the manure can't be put upon it without cutting the land up, labor is valuable and it makes a combination against the farmer that should be carefully guarded against. By keeping that manure in the barn until fall you have lost the fertilizing value of it during the season. I continue this hauling out of manure until the first of April, when I intend the land for corn, as is usually my practice. I find it not profitable to continue hauling directly to this field later than the first of April, but up to that time I find the manure has sufficient time to leach and form a good mulch upon the soil.

H. C. THOM—I would like to ask three or four questions on this subject. If a man has got forty head of young stock and they are running in a barn and the manure is left there until spring, as Mr. Van Matre has said, I can't see that he has lost any liquid; I can't see that he has lost any solids; I can't see but that he is in the best possible condition to distribute the manure upon the land. I can't see that it costs as much to haul it then as it does in the winter time. I can't see but that manure in the fall, when carried out as Mr. Van Matre says, will take one-third less time; the land is in better condition to scatter it over than in the winter; the manure is not two-thirds, or perhaps more than one-half as much in quantity and it is in the best possible condition. Then again there are two-thirds of the farmers of this state that don't do their plowing in the fall, and if they don't do their plowing in the fall, there isn't a place to put the manure if they haul it every day in the winter, unless they put it on the pasture, and no man can stand on a wagon and intelligently distribute that manure upon the pasture as it comes from the stable in the winter time. A man can go to work with his teams in the fall and distribute this manure a good deal easier.

MR. TRUE—Before the closing of this discussion I want to say that I think there is a disposition on the part of some speakers, as there is in every new thing that seems to be suddenly popularized, to give too much importance, by giving credit for loss of too much fertility by leaching. What I want to get at is the remark made by Mr. Van Matre that one load of manure housed as he suggests is worth a half dozen stored in heaps as I suggested. That being the case, the results must be remarkable on his land. I grant that upon the average farm this would apply, but I do claim that if the manure is carefully piled, as I suggested in my leading remarks, the loss from leaching is very inconsiderable. Another point is the advantage that we derive from the rotting of the manure before it is applied to the soil. Recent experiments made in Michigan show that this is much more considerable than we are inclined to give credit for. I do believe that perhaps there is a compromise between the positions assumed here, by building sheds in which the manure may be stored when taken from the stables; in this way the danger of leaching is avoided and we are able to retain the manure until it is well rotted.

THOS. CONVEY—I would like to ask Mr. Thom if he would recommend storing manure on a dairy farm?

H. C. THOM—Yes.

J. S. JONES—You said that you hauled the manure on land you wished to put corn on; do you haul it on sod land and plow in the fall?

T. J. FLEMING—On sod which had been pastured before, and invariably get a good crop. I believe the practical question for most farmers, who are not peculiarly circumstanced, as Mr. Thom and myself are, is, shall we haul direct to the field versus storing in the barnyard. If such men do not haul directly to the field what are they going to do? They are going to cart it out and let it lay in the barnyard. I say to such farmers they should, even if obliged to hitch up every second day, draw that manure to the field and spread it, rather than to let it lie in the barnyard.

H. ROBBINS—I let my stock run out in the barn-yard to the clover stack, and the straw strck, letting the hogs and cows run together, and let them make all the manure they can until after haying and harvesting; I don't touch the manure until I get through harvest; then I haul the manure and spread it and at the same time put one team to plowing; I plow very shallow. Then in the spring I put my disk harrow on to the land and pulverize it just as fine as I can and plant it to corn, and the next year I put it to oats and seed it down to clover and timothy, about half and half; I have a splendid crop of oats, and the next year I have a splendid crop of clover, andthe next year I have a splendid crop of timothy. I have about 40 acres and it takes me just about four years to get around.

L. H. ADAMS—Is it a fact that we can follow either of the extremes we have heard here? Here is Mr. Thom feeding for beef principally, and there is no question that Mr. Thom is all right in the position he has taken in regard to feeding for beef; but here is a dairyman with 30, or 40 or 50 cows, who has got to have his affairs arranged so as to get along with as little bedding as possible. Then there is this question of how to apply the manure. The great objection is the coarseness of the manure, how to handle it and get the fertility out of the manure without the coarse part. We don't care for the coarse part. Now if the question hinges upon getting all there is in the manure, it has occurred to me we have left one point in the discussion. Why cannot farmers, at a little expense, save the liquid part of the manure by itself? That represents from sixty to seventy per cent. of the entire fertility of the manure. Why not save it by itself, and then you have got it in a way that you can apply it to any crop, to corn or whatever crop you choose, and the roots will take it at once; apply it on the meadow and there is nothing there for the hay rake to take up later on. Wonderful results are reported from the use of liquid manure in the manner suggested. This liquid manure can be saved easily by having a cistern running underneath the floor of the stable, which cistern is cemented so as to retain the the fluid. Let the stable floor have an inch taken out of it back of the cows, and let it also have an incline of half an inch, sufficient to drain the liquid manure down into the cistern, where it may remain until the next spring; then it may be pumped from the cistern into a tank on a wagon, and may be taken out on to the meadow or wherever it is wanted and the flow regulated by some such an arrangement as is used on a sprinkling cart, and the liquid allowed to flow out upon a board and to spread upon the ground. Liquid manure can be applied in that way cheaper because it is condensed, and you can take out more fertilizing value in one load of liquid manure than in a half a dozen loads of common manure. Why not save that manure in the most perfect manner possible?

SUPT. MORRISON—I think that every man is confronted with this problem upon his own farm, and I think that the first thing he ought to make up his mind to save and to utilize all of the manure that he possibly can. That is the first thing that I would recommend. But you see you are surrounded by so many different conditions. Here is Mr. Thom feeding almost entirely for beef; here is Mr. Fleming running a winter dairy; and here is another man who has only got five or six cows; so that all of their conditions are dissimilar, and it appears to me that the only thing I would attempt to do would be to save that manure so that I could utilize it to the best advantage. I am very confident that there is a great waste in this respect in the state of Wisconsin; it would appall us if we knew the extent of the waste; it would more than pay our taxes, far more. Occasionally we come across a farmer who regrets that our state expends $12,000 for farm institutes, but that is nothing but a drop in the bucket to the amount wasted in the handling of manure. I haven't any doubt that upon the farms of Wisconsin we are losing twenty-five or thirty millions of dollars, but it runs away so quietly that we do not notice it.

The only crops that pay are large crops and are produced by having the land rich and thorough tillage. This is secured by plowing under growing crops or the direct application of barnyard manure.

Ordinarilly, commercial fertilizers are out of the question; the most profitable way is to manufacture on the farm by keeping live stock. There is a great difference in the value of manure. Straw manure and manure made by using bran or oil meal are very different. If the food is rich the manure will be rich and *vice versa*.

The elements that are lacking or apt to be lacking are nitrogen, phosophoric acid and potash, and which we wish to supply.

Different food contains these elements in different proportions. A ton of bran after you have fed it and extracted the feed value is worth 80 per cent. of its cost for manure. You can afford to feed largely of bran.

Malt sprouts is also a profitable feed and is very rich in elements of fertility, and best fed in connection with wheat, bran, corn meal, etc.

After you have secured the manure the question of applying to secure the greatest returns, don't let the manure heat and become fire-fanged, as the most expensive element, nitrogen, has evaporated. Valuable elements can also be washed out. The liquid as well as the solid parts of the manure is the most valuable, but to receive the greatest value they should be combined. How shall we save the liquid? will depend largely upon your surroundings. Use straw as an absorbent, or any absorbent that is most convenient. In the application the best way is to draw directly from the stable and apply upon the land; if not convenient let it accumulate in the stable, it appears slovenly, but, I believe, it will retain all the elements of fertility that it possesses. Make the manure and utilize it by getting it out on the land and not waste its valuable properties by heating, evaporation or leaching.

The present depression in agriculture, low prices, etc., will teach us some valuable lessons. It is the little economies we must look after. The little leaks and wastes that run away with the small profits. Different economies make all the difference.

The owner of poor stock must visit his neighbor and learn of him, and note the difference. Of two men on lands originally identical one is thriving, the other says "farming don't pay." Prosperous farmers adopt systematic methods. Our best thinkers are getting the most profit. Attend the farm institute and question the most successful. Take courage. The world must be fed, and mouths are rapidly multiplying, while the acres cannot increase. The depression of farm property cannot last. Be hopeful, economize, improve, stop all the wastes. Different economies make all the difference.

SILO EXPERIENCE.

By L. H. ADAMS.

SUPT. MORRISON—The next question that we are going to present to you is one of vital importance, that is the silo question. This subject will be introduced by Mr. L. H. Adams, the superintendent of the Experimental farm.

L. H. ADAMS—Mr. Chairman, Ladies and Gentlemen: This very new and yet old question of the silo once more. It seems to be getting old to me, and yet I have been wondering why it is that we have got to prove, and reprove, and talk and preach about the silo and the merits of it, when we have such men as Hiram Smith, C. R. Beach and Mr. Goodrich who have used the silo, stand up before you and tell you their experience and what it has done for them. And yet we have got to pound away as we have to do on so many farm topics.

A close and intelligent observer cannot have failed to notice that the inquiries on silo topics are taking a new direction. It is not so much, Does it pay to build a silo, as it is, How can we perfect the silo and get still better results? I can see we are making a great deal of progress, but we have got very much to learn yet on this question. There is a great deal about the fermentation in the silo that we do not understand, and it will probably be sometime before we do, but we know enough about it already to enable us to preserve our corn crop in a way that we cannot do by any other means.

I shall quote a few experiments to you, showing what ensilage will do when compared with dry fodder. One of our experiments lasted forty-two days. We fed sweet corn ensilage against the same kind of dry fodder.

Four thousand nine hundred and sixty pounds of ensilage produced 1,688 pounds of milk, which made sixty-two pounds and three ounces of butter; 1,227 pounds of fodder produced 1,487 pounds of milk, which made fifty-eight pounds eleven ounces of butter; excess in favor of ensilage, 201 pounds of milk and three pounds eight ounces of butter.

Another experiment with B. & W. ensilage corn we fed for a period of twenty-eight days; 3,600 pounds produced 1,100 pounds of milk, which made forty-four pounds ten ounces of butter; 820 pounds of fodder produced 1,113 pounds of milk, which made forty-four pounds nine ounces of butter, excess in favor of fodder thirteen pounds of milk, and in favor of ensilage, one ounce of butter.

In another trial where whole ensilage was fed against whole fodder—I mean by this, corn that was taken from the field and laid into the silo without passing it through a feed cutter—of B. & W. variety, 2,298 pounds of ensilage produced 694 pounds of milk, which made thirty pounds four ounces of butter; and 887 pounds of fodder produced 715 pounds of milk, which made twenty-seven pounds and fifteen ounces of butter; excess in favor of fodder twenty-one pounds of milk; in favor ensilage, two pounds five ounces of butter.

Ensilage comes the nearest to taking the place of green grass in the winter time of any feed we can give our cows, and as you are well aware that the butter comes quicker and nicer in the summer time, when the cows are on pasture, than in the winter when they are on dry feed, you can understand the effect that the ensilage has upon the cows.

Let us consider the ensilage question in connection with beef production. Eight steers were divided into two lots of four each and were fed for 36 days. The first lot were given 7,898 pounds of ensilage in all; it was mixed B. & W. and a flint variety of corn; that is, they were fed 55 pounds each daily and they gained one and one-half pounds daily. The other lot of cattle ate 3,502 pounds of ensilage, which was nearly 25 pounds each daily, together with 14½ pounds of shelled corn, six and three-fourths pounds of bran, and gained three and seven-tenths pounds each daily. Four hogs ran with the steers getting the corn, and by feeding 92 pounds additional to them they made a gain of 100 pounds.

Therefore, to make 100 pounds of gain from ensilage we have 3,558 pounds of ensilage at $2.50 per ton, $4.44. To produce 100 pounds of gain of steers and 100 pounds of gain with hogs, required 669 pounds of grain at $15 per ton, and 654 pounds of ensilage at $2.50 per ton, or a total of $5.82.

If we allow that an acre of land will produce 25,000 pounds of wilted ensilage, such as was used in these experiments, since 3,558 pounds made 100 pounds of gain with the first lot of steers, an acre of ensilage will give over 700 pounds of gain. So much for experiments regarding ensilage and dry fodder.

Now what other advantages does the silo offer over the old method of curing fodder and stacking it, or leaving it in the field, as is the ordinary practice. The first great advantage is this—the silo enables you to take the green crop and preserve it one year the same as another. Can you do that when you undertake to cure your corn? When fodder is stacked there is a loss equal to that which takes place in the silo. Last fall we took a shock of corn cured in an excellent manner, and after taking a small sample of it for chemical analysis, we wrapped the remainder up in a sheet, so that it could by no possibility be mistaken, and we put that shock in the center of a stack, where it was not exposed at all, and where it remained for five months. We took it out a short time ago and cut it all up and took another sample for chemical analysis and found that the loss of feeding matter in that shock was 22.6 per cent., while we only allow about 10 to 15 per cent. loss in the silo.

Another Saving.

Another advantage that the silo offers over the ordinary process of curing fodder is in the lessened cost of taking care of the crop and getting it to our animals. How does it do this? First, by cutting off the expense of husking the corn. It will cost you an eighth of the expense of a corn crop to husk it alone. By putting the corn into the silo you do away with the expense of grinding, which will cost another eighth. There is a quarter of the corn crop for those two features, that you can cut off and it is this lopping off of the square corners that we have been turning so long that the silo offers its greatest advantages.

One more advantage of the silo is that it offers you a succulent food for your cattle in the winter time, and gives you better results as a consequence.

Perhaps you doubt my statement when I say that ensilage will take the place of a grinder. I have made a few observations in this respect which I wish to relate to you. On the Experiment farm, some cows were fed ensilage and others dry fodder, I noticed that there was not nearly as much corn in the excrement behind the cows being fed ensilage as in that behind the cows being fed dry fodder. I saved droppings for twenty-four hours behind the cows, or rather the droppings of two cows for twelve hours. Then I washed the grain out of the excrement thoroughly, and remember that if there was any error it was on the other side, it was rather in favor of my not getting as much corn out of the manure, than of getting all of it, for in washing it there was a good deal that washed off and we couldn't recover it. But I found that one cow in twenty-four hours was voiding that quantity (exhibiting can) of corn, that is the one that was being fed dry fodder, and the one being fed ensilage was voiding that amount. (Showing another can.) Ten per cent of the grain fed to the cow kept upon dry fodder was being voided, and not one per cent. of the grain was undigested when fed upon silage.

Advantages.

Now, farmers, it is time that we were coming down to sober, practical sense in regard to this silo. There is nothing gained by claiming all creation for the silo. It has enough of merit to commend it to the thoughtful consideration of the beef feeder and the dairyman, without making extravagant claims for it, and the advantages that it possess are substantially what I have told you, nothing more and nothing less. You do not take out all of the feeding value that you put in your silo. Why? Because it is burned up, destroyed by the heat that is generated in the silo. We are learning to reduce this heat. We at one time thought it was necessary, but we are learning to reduce it as fast as possible, and my last impressions and ideas in regard to the preservation of ensilage are that we have got to go back partially over the ground that we passed in our rapid change from over-weighting to non-weighting. I think we have got to take an intermediate position. We know that when we first started out we weighted heavily and excluded the air, and then one man reported good results without weighting and over we went to non-weighting; but it is the exclusion of the air in the silo that preserves the fodder, and the more air we keep out the more perfect the preservation.

Some Weighting.

I give it out as my last impression that a little weighting is necessary, and that that is the proper thing to do in our silos. It may be done in this way: take a plank and lay it alongside of the wall, not tight up to the wall but off a half an inch or an inch, and across the ends of the silo also; then take nail kegs or barrels and fill them with earth and set them on these planks so as to compress it as rapidly as possible. The latest experiments in this silo question are to this effect, that the only advantage of heating in the silo is in aiding to exclude the air. When the mass begins to heat up you at once begin to see it settle down and pack, and when it is undergoing the settling process the air is going out of it, and the more that we can hasten that settling and the tighter we can get it, the more air it will expel and the better ensilage it will be.

SILO EXPERIENCE.

By WELDON VAN KIRK.

A General Success.

In a winter's intercourse with the farmers of Wisconsin, we have failed to find the man, who having built and filled a silo, has said he regretted the move. Occasionally the man has put in an appearance who has chosen to champion dry feed as a better ration than ensilage, upon the ground that it is a more natural food for winter. That it can be preserved cheaper. That there is less loss, etc. But it is a noticeable fact that all such persons are without experience upon which to base their conclusions. True, not all have reported entire success. Some have made partial failures from one cause, and some from another, but all have seemed confident of their ability to trace the cause of their trouble to some mistake that may easily be avoided in the future.

Who Need Silos?

The discussions of the subject at the institutes we have attended, while not marked by that enthusiasm so often aroused by the early advocates, has yet shown a degree of satisfaction on the part of men of experience and of inquisitiveness on the part of others, that denotes a possibility of extensive silo building for the future. After three years of personal experience and after having had an opportunity of hearing the ideas of scores of men of more or less extended experince, we have arrived at the conclusion that no farmer has any use for the silo who ordinarily has more fodder than he can dispose of to advantage with the stock that he keeps; who always has hay to sell and straw to be trampled under foot and who thinks corn stalks are not worth cutting, and allows them to stand in the field and turns the cattle in for a few days after husking; whose cows habitualy dry up in the fall and remain so until spring, spending their days rustling around the yards and their nights tied in cold stables.

The Silo, Success and Fertility.

On the other hand we believe that the man who realizes the necessity of extensive stock raising in order to maintain the fertility of his farm will find in the silo one of the most potent agencies for the accomplishment of his end. He who provides for his stock warm stables and wishes to produce milk in winter when it is worth most, or who wants a succulent ration for fattening steers, for young cattle, or even for sheep or horses during the long months when stock are otherwise obliged to live entirely upon dry and more or less indigestible food, will we believe appreciate ensilage. Nor is its use necessarily confined to winter; each of the past two springs we have had a little remaining that has been very satisfactorily fed the following August This year we expect to have left about one-fourth of our entire lot of silage which will go a long way toward piecing out short pastures next summer, and will obviate the necessity of cutting any of next year's crop for soiling purposes before it reaches a desirable stage of maturity.

What to Build of.

To the man of limited means who must build cheaply or not at all we would still recommend the silo built of lumber. Wherever it may be built in the bay of a barn the material of its construction ought not to cost over fifty cents per ton of its storage capacity. The expense of our own was a trifle less than that amount. To the man who has capital at his disposal and wishes to build in the most durable manner possible and at the same time secure the very best possible results in the preservation of his silage we would say, build of masonry.

This may seem like heresy to persons who have kept posted regarding the teachings upon this subject of the past few years, but to such as think it impossible to preserve the best quality of silage in a stone or brick silo we would recommend a visit to the farm of Mr. J. W. Hays, of Alderly, or Mr. Schrader, of Hartford.

At either place will be shown silos of this sort by the owners who enthusiastically recommend the plan. At Mr. Schrader's we found an article of ensilage that for quality has not been surpassed by any of the numerous good samples it has been our good fortune to inspect. As a matter of course these gentlemen have taken the precaution to prevent frost from penetrating the walls by boarding up the outside in such a way as to form a dead air space. The walls of stone or brick are carefully built and plastered with water lime, as are also the bottoms of the pits. The only objection we are able to find with this method of building is the expense. As nearly as we could ascertain the cost of construction was about three dollars per ton—and cost with the most of us cuts a big figure. Undoubtedly where sufficient depth is attainable one pit is better than two or more.

We consider depth desirable, first because the silage settles more solidly and enables us to store a greater quantity in a given space, and second, there is a smaller percentage of the whole damaged by exposure at the top.

In silos less than 25 or 30 feet deep we prefer the partition, not from any benefit to the silage to be derived from filling first a few feet into one pit and then a few into the other, but because we dislike to have so large a surface exposed while feeding out. We prefer feeding from the top, *taking care to keep the surface level* rather than to cut it down in sections, or feed from a slanting surface, for by the latter method, unless the building be long and shallow, a larger surface will be exposed than by the former method.

The variety of corn that may best be depended upon is still and may perhaps remain a somewhat unsettled question.

So much depends upon soil and climate that a kind suited to one locality might not prove good in another. Whatever proves most satisfactory as a crop to be harvested in the ordinary way will, we think, make the best silage crop.

About one-half of our last summer's make was of mammoth sweet corn, and while it is not as sweet silage as we wish it was, yet it certainly is richer than that made from the B. & W. corn. We have not found it necessary to feed so much of it, nor so much grain with it as with the B. & W.

Figuring the weight at 40 pounds per cubic foot in the silo, we find that the B. & W. with us yielded 16 tons per acre and the sweet corn 12 tons.

We estimate that we have fed 10 per cent. more of the large than of the small kind and about 10 per cent. more of grain with it. And as the grain is the more expensive part of our ration we consider this something of an item.

We believe that it may be possible to harvest the remarkable yields, that have sometimes been reported, of 30 or 40 tons per acre by a system of thick planting and cutting while immature, but we do not consider it profitable. The question with us is not how many tons of green sour silage we can produce per acre upon which to expend our strength in harvesting, but how many tons of mature corn with plenty of well developed ears can be produced with just moisture enough remaining in it to produce the desired results.

DISCUSSION.

QUESTION—I would like to ask Mr. Van Kirk what he covers his silo with?

MR. VAN KIRK—With green grass this year. The results were better than with anything else we have tried, although the grass was not as green as we like to have it.

J. S. JONES—Were the corners square or round?

MR. VAN KIRK—Ours are square, but I should prefer to have them round.

J. S. JONES—How would you round them in a house already built?

MR. VAN. KIRK—About the only thing that can be done is to bevel the edge of of a plank and nail it in the corner and fill in the space behind with sawdust or clay or something of that kind.

O. S. JONES—Would you build them above or in the ground?

MR. VAN KIRK—Above ground.

QUESTION—How do you fill them, rapidly or slowly?

WELDON VAN KIRK—Just as rapidly as possible.

J. S. JONES—After putting in ensilage slowly have you ever found out that it was moldy?

WELDON VAN KIRK—The first two years that we filled the silo we supposed it was imperatively necessary to fill it slowly, and in some instances we allowed it to remain three and even four days, until it reached a temperature of 125 degrees before putting in any more, and we did find mold on the surface to some extent; we have lately put it in just as fast as possible with better results. It was more moldy in the corners than any other place.

G. C. HENDY—I would like to ask if a round silo wouldn't be better?

WELDON VAN KIRK—I think so; that is mere theory, however.

JAMES SPENSLEY—Wouldn't a stone silo do just as well under ground as entirely above ground?

WELDON VAN KIRK—Certainly, as far as the preservation of the ensilage is concerned, but you can elevate it into the silo cheaper than you can elevate it out.

JAMES SPENSLEY—Suppose it was on the hillside?

MR. VAN KIRK—Then that would be a good plan. The stone wall as far as it was banked on the outside by dirt wouldn't need to be protected in any other way, but wherever the stone wall had been exposed above ground there has been damage to the ensilage next to the wall.

G. C. HENDY—I would like to ask how you take out ensilage in using it without damage to it?

MR. VAN KIRK—We feed from the surface and we throw off a layer each day and we don't find it is damaged to any extent by being exposed for one or two days. We do not cover after removing a layer. We find when we commence feeding again that it is destroyed just as far down as the air penetrates it.

W. H. COLE—I would like to inquire if it is best to put partitions through the silo, provided it is of large capacity?

MR. VAN KIRK—That would depend entirely upon the depth. I recommend partitions in shallow silos that contain a large amount of ensilage, because you readily see a large surface would be exposed, and it is desirable to have just as small a surface as possible.

MR. RUNDEL — In an underground stable, could a silo be built say, in the upper part by the barn, and feed through a drive-way in the stable; if you had a silo built in the bank could you feed right out of the side of the silo, say, by having a door into the silo leading immediately into the gangway of the stable?

MR. VAN KIRK—I think that is a very good plan. Our silo is 24 feet deep with door from top to bottom, through which we pitch the ensilage.

O. S. JONES—What kind of material would you recommend a person to build a silo of, stone, brick or lumber?

MR. VAN KIRK—I stated in my paper that if one has the means, and wishes to build a most durable one, I would recommend a stone or brick silo, with a protection on the outside in some way, making a dead-air space, thus giving protection against frost. For the man who must build cheaply I would recommend the silo of lumber, two courses of boards, with tar paper between, which will give very good results as I can testify from experience.

T. J. VAN MATRE—I would like to ask if there is any advantage in siloing clover over the plan of cutting it and storing it for hay?

MR. VAN KIRK—There is, but we have got much to learn about clover, and it is well that this question was brought up. We put in clover last year in the silo and it made excellent ensilage; we put it in this year and it didn't keep so well. I think this was the cause of it: It is more difficult to exclude the air when a silo is filled with clover than it is when filled with cut corn. It doesn't pack so closely and to overcome that we will have to put the clover in a little greener in my estimation; say when it is in full bloom, then weight it a little heavier than we would corn and let it settle. One of the great advantages is in being able to preserve our clover crop in a way we are not able to otherwise. Good clover hay is one of the best feeds, and poor clover hay is one of the worst.

H. C. THOM — Would you recommend running clover through a feed cutter?

MR. VAN KIRK — I don't. I should keep it spread evenly as it goes into the silo, so that the settling is the same all over. Don't pile it up at one end and have that weighted down and the other end way up. I try to keep it spread evenly and pack it on the sides and weight it pretty heavily after you get through.

W. H. COLE—Would you allow clover to wilt any after cutting?

MR. VAN KIRK—I shouldn't object to having it wilt from two to five hours; you would get that much wilting the best you could do.

MR. FLEMING—I will simply give you my experience. I have operated a silo for four years with good success. The first year I filled half of my silo with Southern corn, and the other half with another variety of corn. I was dissatisfied with the Southern corn, and what I saw then and have observed since, has led me to believe that the Southern varieties of corn have no business in my locality for the silo. My silo is constructed of wood at a cost of 70 cents per ton of storing capacity. I cut my corn as it is about to dent, passing from the milk stage to maturity, or when the lower leaves on the stalk show a brownish color. At that time I believe that all the food there is going to be in the plant is in it, and as I propose to use the whole plant I don't care whether it is centralized in the ear or distributed through the whole. I run it through a feed cutter and cut it into one-half inch strips. The past year I cut it a half and the year before I cut it a quarter. I think you can get a little more into the silo by cutting it fine. I have filled rapidly and have filled slowly, with no material difference in results. I have come to the conclusion, however, from my past experience, that the coming system for filling the silo is to fill it as quickly as possible, being careful, however, as to maturity of the corn. In order to maintain this maturity through the whole period of filling, I plant two varieties of corn; first, Yellow Flint, and second, the Yellow Dent. I fill from the Yellow Flint first and from the Yellow Dent afterwards, as there is little difference in maturity. In this way you are able to fill the silo with corn in very nearly the same stage of maturity. Cover the silo as quick as filled.

As your silo is filled the top portion of the ensilage will heat most quickly, not only from the heat which it itself generates but from the heat arising from below. I have covered my silo the last two years with wild grass, that has had considerable moisture in it. It was not cut until it was wanted to cover the silo. I put on about 12 inches of it, as much as there was room for in my silo, couldn't reach up into the gable, and I found it made a perfectly hermetical covering. There was positively no loss when I removed it; no weight was used more than that. I do not think hay would give the same results. It must be sufficiently wet in covering to follow the ensilage as it settles and to follow close to the wall. I found that the animals partook greedily of the hay with which the ensilage was covered. The doors are in sections from the ground to the top; we took out the top section and raked off the top evenly; we take off in the morning what we purpose to feed in the evening, and what we purpose to feed in the morning we take off in the evening.

MR. GOODRICH—I will confine my remarks to just one point. I commenced to study the silo in the year 1876. I saw the first silo that was built west of the Allegheny mountains, and I saw the first ensilage taken out of it, the idea struck me then, How will that effect the butter? I asked that question for thirteen years before I could answer it. Every man that had a silo said it didn't hurt the milk, and every man that didn't have one said it spoiled it. But I found out as soon as my butter made from the ensilage began to get into the Chicago market, the commission men voluntarily wrote to me, and said: The flavor of your butter is splendid, and I was able to raise the price two cents a pound in a very short time. That satisfied me; that is what I am after; it makes no difference whether anybody that sits at my table can eat it or not. Now, there has been butter injured by feeding ensilage, there is no question about that. You feed damaged, rotten, bad-smelling ensilage, and you will get damaged, rotten milk. Some men have told me it didn't make any difference, but I have turned away from them, for they don't know anything about it. You feed good ensilage and it makes better flavored butter than can be made from dry feed. I not only know it, but the customers in Chicago know it, and that is the point I am after.

There is one other point as to the cost of a silo. Men are sometimes misled by being told that a silo can be built very cheap, for 15 or 20 or 60 cents a ton. He has not counted in his own work when he comes to tell you about that. One man told me it hadn't cost him anything but for the nails. He had the lumber in a tobacco shed that he took down and he did the work himself, and it didn't cost him anything. That cost just whatever was put into it. I built what they call a 200-ton silo, that is, there are about 8,000 cubic feet in it, but you can't get 200 tons into it by any ordinary human power, even if 40 cubic feet will make a ton; it has got to settle. It probably holds 160 tons. It cost me $240 to build it. I can give the items for all of it. The lumber bill was something like $175 at Ft. Atkinson. The $240, at 160 tons capacity, would make the cost $1.50 per ton. I might perhaps have built it a little cheaper, and I built it perhaps stronger than necessary.

SUPT. MORRISON—What size is it?

C. P. GOODRICH—It is 36 feet long by 17 feet wide, outside measure, and 16 feet deep; I have no partition in it.

L. H. ADAMS—Your silo is an outside silo, isn't it?

C. P. GOODRICH—Yes, it is built practically detached from the barn; that is the cost of the separate silo.

L. H. ADAMS—The cost that Mr. Van Kirk gave was for a silo in the barn.

T. L. HACKER—My experience with the silo has been for only three years. I had a barn in which there was an old bay; I took out the flooring and put up the joists, 2x10. The full height of the bay was about fifteen feet. The first year I put in B. & W. corn. I put it in a little too green. I cut it about half an inch in length and elevated it into the silo, but I did not, as was the custom at that time, weight it any. I simply leveled it off and threw on a little straw that I happened to have, to gather the moisture as it was evaporated. That ensilage was not satisfactory to me. It didn't give as good results as I had had the two years previous in cured corn fodder, which I had planted, the B. &

W. corn, and cut it as I fed it, into strips about half an inch in length. There was less loss in the manger with the fodder corn than with the ensilage, although there was not much loss with the ensilage. The ensilage was too sour. I attributed it to a lack of maturity. The next year I planted the Dent corn and the B. & W. corn. This time I cut it in two-inch lengths. The silo was filled half full of Dent corn, cut from the milk stage to the glazing stage, and then I filled up with the B. & W. corn, and for some reason or other there was considerable spoiled ensilage with the last; it was too sour to suit me, although my cattle seemed to like it and did very well on it.

The last lear it was Dent corn and I put it in whole; I let it get beyond the milk stage, and it was fairly glazed, and the kernels were like dough. I cut it with one of these sweep rake reapers and put it in whole and it has been a failure so far as being good ensilage is concerned.

SUPT. MORRISON—Wasn't it too dry, too mature?

T. L. HACKER—It heat up and actually dried out, there wasn't a particle of moisture in that silo from top to bottom.

QUESTION—What did you cover it with?

T. L. HACKER—I covered with green marsh grass; I put on about two feet of settled grass; there was room above the silo so I could pile it up, so I put in two feet of settled green grass.

QUESTION—How did you build that silo?

T. L. HACKER—I put on the inside good stock boards; then I covered it with black felt; and then I put good common stock boards over that; my bill I think was $53, not counting the labor of myself and hired men.

I was going to remark about the cured fodder that I have this year. Every bit of that corn has been eaten up, there hasn't been a particle waste, even the stalks. I haven't fed it to dairy cows but I have fed it to young stock and the other cattle that I was not milking, and they have certainly made very good use of it and have done very well on it; I have not fed the cattle a particle of grain this winter and they are looking well.

H. C. THOM—Two or three kinds of corn are not necessary to put in a silo. One is enough. The place for a silo is in the barn. The cost to me of building a silo that holds 250 tons, is $112.60. If you haven't anything else to cover with, cover with straw, run it through a machine and weight it. More damage is done to cattle by over-feeding silage than we suppose; 45 pounds is enough for a cow, and 50 pounds is enough for a two or three year old steer. Exclusive feeding of silage will taint the milk. The kind of corn to put in a silo, in my opinion, is the kind of corn which will produce the largest stalk that will get ripe. If we could raise a kind of corn that had no ears on it, it would answer the purpose of dairymen, I am sure, and I know it would those of beef producers. The function of a silo is to take the place of pasturage, which we get in summer, in the winter time. There is more danger of losing silage from putting it in too late than from any other one cause. It will dry from top to bottom if put in too late. If silage is put in too green it will inevitably turn sour, and we don't want it.

C. R. BEACH—I have used ensilage three years. I have used the Yollow Flint and Yankee corn planted with a horse planter, in hills twice as thick as I ordinarily plant Dent corn, about eighteen inches apart. We cultivate it, hand-hoe the rows, and in this way raised 130 bushels to the acre this year. We cut it with a reaper and lay it off in bundles. We use two drays to pick it up, run it through a cutter which we run with a one horse power, and in that way four men put in an acre and a half a day. I feed it exclusively to cows. We cut it an inch and a half long. Mr. Adams was down there and said our corn would yield about fifteen or sixteen tons to the acre. We find no bad results from feeding it. We feed it in connection with bran and hay, about forty pounds a day of it, with ten or twelve pounds of bran, and upon it the cows fresh in milk will give a pound of butter a day for 200 days. We like it and don't know how we could do without it. On a farm of seventy acres we have wintered for three winters forty cows. This year we shall have thirty tons of hay left over. Under this system we can harvest an acre of corn cheaper than by any other possible process. The corn is thoroughly digested, the cows like it and give large quantities of milk, the butter is good and everything satisfactory.

J. S. JONES—I have a silo 16 by 30 feet. I filled it this last season, and in taking out the ensilage I find a great deal of it got moldy in patches. In filling it I went according to the directions of some man who had built a silo. He said to keep the outside sloping; tramp the outside and never mind the middle. I did so, and in filling it I didn't pay any attention to the holes, until I straightened it out on the top, and then I tried to make it level, and I think that in most of the places the mold was the consequence of the ensilage not being kept solid in the center.

SUPT. MORRISON—Farmers never seem to think their own time is worth anything. I have an estimate here of the cost of putting ensilage in a silo, which estimate was given to me by Mr. Foster, deputy railroad commissioner; he had to hire it all done and consequently he had an account of it, and I think that you will be very much interested in it. It is as follows:

COST OF ENSILAGE.

An Estimate of Raising, and Putting Into the Silo an Acre of Ensilage Corn.

Hauling out, and spreading, 20 loads of manure	$3 00
Plowing, dragging, and seeding one acre	3 00
Cultivating one acre six times	3 00
Cutting up one acre of corn, and laying in piles, ready for hauling	2 00
Labor of two men, at the cutting machine.	3 00
For use of machine, and carrier, and power to run the carrier	3 00
Hauling one acre of corn to the silo	3 00
Total cost of raising, and putting into silo an acre of corn	$20 00

An acre farmed as here suggested, would produce 16 tons—making an average cost per ton—of ensilage $1.25.

Six tons of this ensilage would furnish a cow 240 days, or 8 months, with a feed of 50 pounds per day. The cost would be	$ 7 50
Ten pounds of hay per day—2,400 pounds, at $5.00 per ton	6 00
One ton of bran—for the 240 days	10 00
Pasturage for four months	8 00
Bran for the four months (one-half ton).	5 00
Total cost of keeping cow for one year	$36 50

That kind of feed should make 350 pounds of butter.

So you see at the end he is going to figure out a good margin. There you have the total cost of putting in an acre of ensilage corn and also the cost of keeping a cow a year by a business man.

H. C. THOM—There are two reasons why it will mold in the middle of the silo in patches. I think the main reason is because you put some corn in when it was wet on the outside.

J. S. JONES—No, sir, it was not; I think it was because it was dry on the outside.

H. C. THOM—Those are the two reason I was trying to get to; the one that it was too wet and the other that it was too dry.

SUPT. MORRISON —I would advise any contemplating building a silo to visit some man who has one and who has been successful with it. You will find lots of them all through the state, and if you go and visit them, then you can make up your mind whether to build a silo or not.

SWINE SESSION.

HOW TO BREED AND FATTEN SWINE.

By GEORGE WYLIE.

No System.

Many farmers go into swine raising without distinct or well defined plans as to the object to be finally attained. With them numbers is of the first importance, when in reality the point to be reached should be the greatest profit in the shortest time, which means the hog that can make the most pork on the least food.

It follows then, that the assimilative capacity of the swine fed, is of the first importance, and it goes without saying, that by proper selection and cultivation the assimilative capacity may be maintained or largely increased; but can also be lost in less than a single generation by careless feeding and improper management, no matter how high a point it may have reached.

Strong powers of assimilation are never found in swine that are lacking in constitutional vigor and substance. In breeding swine there is a point on the side of fineness and finish beyond which it is not profitable to go. A hog that at maturity cannot from the fineness of its breeding be made to weigh much over 300 pounds will not be a profitable feeder even up to six months of age. A hog that at maturity weighs 500 pounds with other things being equal will be a more profitable feeder when young.

There is such a thing as people being "governed too much," and it is possible for swine to be bred too far in certain directions to get the greatest amount of profit out of them. When hogs are bred for mere fancy points and finish, and constitution is lost sight of they soon cease to be profitable assimilators of food, notwithstanding the fact that they may have gilt-edged ancestry and themselves be on record in the respective herd book to which they belong. On the other hand there is a point on the side of coarseness beyond which the hog becomes a hard feeder.

The Profitable Hog.

Slab sided, coarse boned hogs that will not fatten under two years of age are not desirable, "but the general tendency of the times is more toward breeding too fine than too coarse" Coarse hogs can be improved in the direction of fineness easier than fine hogs can be brought up to coarseness. At a point between these two extremes can be found our profitable hog. I will not say that this point is midway between these two, as in my judgment the farmer or breeder is safer in finding that point a little nearer the side of coarseness than over the line toward fineness. "Once having a herd of swine with constitution, size, and bone, breed as near as possible to a profitable conformation;" the farmer will find no small amount of thought and study necessary to maintain them at that point; "when the herd begins to show weakness at any particular point" the next infusion of fresh blood should be strong in that direction. But guard against sacrificing one point of merit to obtain another. Hold on to what excellence you may have with one hand while reaching out with the other to add more excellence to it. In the mere study of keeping the different profitable points of the animal well balanced the constitution and size is frequently lost sight of, and the herd sinks below the point of the greatest profit before the owner is aware of it.

Infusion of New Blood.

Again, while the owner may be adding from time to time what he considers suficient bone and substance to maintain the herd at a profitable standard, if he feeds largely on corn he will find the general substance of the herd growing less and less, and instead of studying out the cause he is liable to conclude that this particular breed has become too fine for profit and he will try a cross or a mixture of something else. And with this resolution, qualities that have cost breeders years of patient work are cast aside and lost, for with the infusion of blood from another breed, the whole concern drops back to first conditions. When by a judicious infusion of new blood from the same breed and a change to food of a protein nature the herd in a short time might have been bred back from the danger line and placed on a profitable basis. I take it for granted that it is unnecessary to go into any argument as to the necessity of using pure bred sires of the breed that you propose to stand by. The beginner who expects to breed for pork only may start with such sows as he may have at hand, but he should fix a well defined type in his mind toward which to breed, and always make selections with that type in view. The nearer the stock approaches the typical representatives of the breed you are working with, the more difficult will the selection of the right kind of a sire become.

Careful Feeding.

In order to obtain the best results all around, pigs should be taught to eat as early in life as possible. In some cases this will be when they are about two weeks of age. The time of teaching them to eat will vary. The size of the litter in some cases, and in others the amount of milk given by the dam, will govern it. Teaching them to eat is best accomplished by placing a small trough out of reach of the dam and supplying it with warm sweet skim milk and soaked corn. When the pigs have fairly got to eating be careful to increase the feed as gradually as the pig's power of assimilation increases. And right here care should be exercised in feeding the dam; avoid getting her "off" her feed. There is nothing so well adapted to make young pigs grow as their dam's milk, and while feeding the pigs liberally the sow should be fed all she will eat of the food best calculated to make her give large quantities of milk. Good shorts mixed with bran, or the shorts alone made into a slop and soaked between feeds, accompanied by a few ears of corn make a good milk-giving ration. The sow is first fed all the slop she will eat up clean, and then fed the corn. If you can follow the corn with a supply of skim milk, you will be getting nearer perfection. There are other combinations of feed equally as good as this, and if you can make an occasional change all the better. But when pigs are very young, sudden changes of food for the dam should be avoided, or if made must be made with care, as such changes are liable to have an injurious effect on the pigs.

Damaged Grain.

Musty or mouldy corn, or in fact damaged grain of any kind should never be fed to a brood sow or her pigs. The right kind of feed, a sensible feeder, a good brood sow with a well-bred litter of pigs 6 to 10 weeks old, make a combination for the production of pork that is very near the highest possible limit of profit, a combination that will come as near keeping even with the big four, as any legislative enactment.

A Well Balanced Ration.

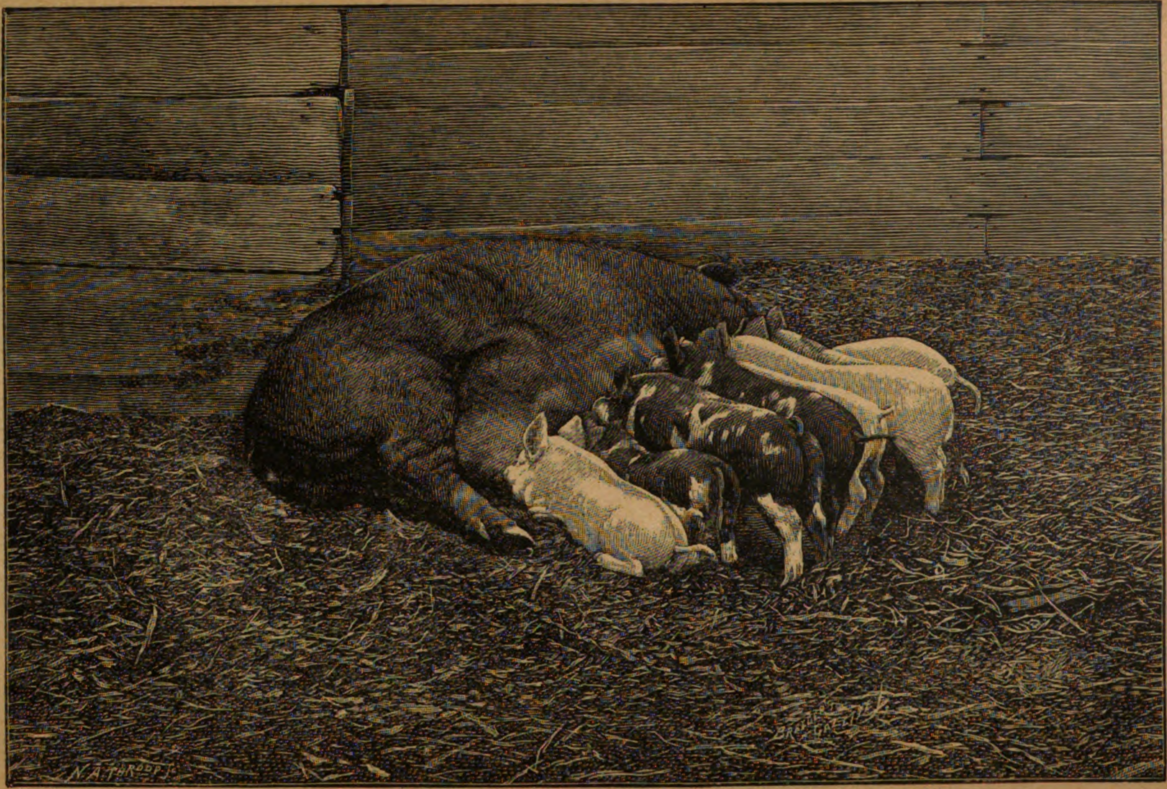
While pigs of this age are being rapidly grown, care must be exercised that they are receiving food of the proper kind to make bone and muscle sufficient to carry them. If fed too heavily on corn at this age they will get weak across the loins, the hind feet will draw up closely together and frequently the pig will be unable to rise without help. When you find one or two of your pigs in this way it is a danger signal and tells you plainly you are feeding too much corn, and a change to a ration containing more protein should be made at once. The object for the first four or five months should be to grow bone and muscle of sufficient strength to carry the fat put on by corn later on. It is understood, of course, that the brood sow and pigs are having the run of a good pasture of some kind. Clover will supply the most feed to the acre, but blue grass is good, and even young timothy is not to be despised. After the pig has reached five months of age the ration of corn can be increased, but not too heavily at first. If the profit is in the first 200 pounds, the quicker you can get your pig to that weight the better after getting on the corn ration.

Hogology.

Good feeding is regular feeding and giving the hogs all they will eat without losing their appetites. To do this successfully the feeder must study closely the capacity of the swine being fed. A feeder who leans over the fence, apparently in a brown study, while the hogs are eating, and then quietly throws over another shovelful of corn or pours in another pailful of slop, is getting better pay for his time than the feeder who, day after day, throws the same amount of feed at the hogs, but has no time to waste studying "hogology."

Food of Support.

The value of different foods, as demonstrated by chemical analysis, are not always borne out in practice. The digestive and assimilative capacity of the animal to which the food is fed cannot be determined by the chemist, and on these depend in a great measure the results obtained by feeding. Considerable more feed will be found necessary for the maintenance ration of 100 pounds of "shark" than 100 pounds of straight Poland China or Berkshire. The small pig that consumed a pailful of rich slop to the surprise and disgust of his owner, who when the pail was empty jammed the pig into it and swore that the pig didn't begin to fill the pail, was taking pretty near 100 per cent. of the food consumed for a maintenance ration. If you desire to know how much the food of support amounts to in a pig that you propose to sell at 200 pounds weight, we will suppose that he reaches that weight in 200 days. As he increases from nothing to 200 pounds then 100 pounds is his average weight for the entire time. And the amount of food per day that will hold him at 100 pounds without losing or gaining will be the



THE FAMILY DINNER PARTY. From Breeders' Gazette, Chicago, Ill.

average food of support per day for the entire 200 days.

It is about time farmers were beginning to realize that greater profits are made from feeding young animals than from feeding old ones. That no one food is as good as a combination of foods. "That good blood will tell." That good common sense is just as essential to success in swine raising as in any other business.

DISCUSSION.

MR. RUNDLE—What do you consider a satisfactory, cheap and practicable ration?

MR. WYLIE—Well, if you are running a dairy, and have lots of milk going to waste, milk would be as good as anything in that case. If you are not a dariyman, shorts will do as well; oats are one of the best feeds in the world.

JOHN MARCH—At what age would you prefer to have your sires for best service?

MR. WYLIE—Yearlings, two-year-olds, and three-year-olds.

JOHN MARCH—At what age or weight can you make pork the most profitable?

MR. WYLIE—Well, in a well-bred pig that is grown right and fed right there is no time in the pig's life that he will make any more pork than between eight weeks and three months of age, or perhaps up to four; it will vary in different individuals.

THOS. CONVEY—You mean if fed corn?

MR. WYLIE—Yes.

J. M. TRUE—For how long a time would you feed them corn to finish them for market?

MR. WYLIE—Well, as soon as you begin to feed corn largely, you want to get them to finish up as quickly as possible on the corn.

J. C. MARTIN—How many pounds of pork do you make from a bushel of corn?

MR. WYLIE—Well, that is a large question. The amount that may be made varies with different animals. We sometimes hear of 17 or 18 pounds being made, and other cases of 14 pounds per bushel, but I don't think the average amount made throughout Wisconsin to-day will exceed 8 pounds. In fact, I know more men that are producing pork at 6 pounds and less, than I do who are producing ten and twelve to the bushel.

J. C. MARTIN—To what do you attribute this?

MR. WYLIE—It is to a difference in the animals that are being fed; this represents the difference between good, well-bred hogs and hogs with no breeding at all.

MR. JOHNSON — In fattening hogs would you confine them in a close pen or let them run in a yard?

MR. WYLIE—I would never confine a pig in a close pen.

GEO. MCKERROW—Would you feed corn entirely at any time, even in the fattening period, to get the best results?

MR. WYLIE — No, sir, not exclusively although you can feed it more then. It is the cheapest food in the world, and they will probably stand more of it then than at any time.

SUPT. MORRISON—Do you advise cooking the feed for hogs?

MR. WYLIE — Not exclusively; it has been pretty thoroughly demonstrated that there is positive loss in feeding hogs exclusively on cooked food.

H. P. RUNDEL—Is there really any advantage in feeding cooked feed at all?

MR. WYLIE — Yes; you can feed three or four meals a week of cooked feed, or perhaps more, with beneficial results; pigs like a change, a variety in their feed, and it is mainly to supply that change that I feed cooked feed.

R. B. BROOKS—Do you feed roots?

MR. WYLIE—I do—mangel wurzel.

T. L. HACKER—At what time do you advise turning off a pig; at what weight?

MR. WYLIE—Well, it has been pretty well demonstrated that the largest profit has been in the first 200 or 250 pounds; when a pig gets up to that weight, if you can by any manner or means do so, turn him off and put the feed into another pig. Better let him go.

MR. HEARD — Have you ever tried peas?

MR. WYLIE—Yes, and they are a very fine feed. I think in this country they are better than corn.

T. L. HACKER — Do you thresh them and grind them?

MR. WYLIE — No, sir; I turn the pigs in and let them harvest them.

T. J. FLEMING — At what age would you change from a bone and muscle producing food to a fat producing one on pigs intended for pork?

MR. WYLIE—Four to five months' old.

JOHN MARCH—At what time of the year do you prefer to have your pigs come?

MR. WYLIE—Generally not before the 15th of April; there is a mistaken idea as to early pigs; a young pig is a very delicate animal; he needs warm air and sunshine, and you do not always have them in March and early April. Pigs that come when there is snow on the ground can't get out on the ground and they are kept in a small pen, and the result is they show their proclivities for fattening up and sleeping, and the first thing you know, when they are about four weeks old, they die with the thumps.

JOHN MARCH—Isn't there any cure for the thumps?

MR. WYLIE — The only cure is to put in plenty of dirt in the pen and make him take exercise; drive him around if you can't do any better.

JOHN MARCH—What is the profit of carrying pigs over winter for the early market?

MR. WYLIE—I have known lots of men to make money carrying over to September and August.

JOHN MARCH — Wouldn't skimmed milk be a valuable article of food during winter?

MR. WYLIE—I think it would. You are fighting aginst weather then; you have got that to contend with, and as pigs are generally wintered in Wisconsin they don't pay for the feed they consume. I believe it possible, though, to winter them at a profit.

C. I. BRIGHAM—At what age do you sell brood sows?

MR. WYLIE — I have kept them till eight years old. I think four years is old enough.

T. J. FLEMING—Isn't a September farrow pig the most profitable for a winter dairymen to keep?

MR. WYLIE—I am not a dairyman. If you have got milk it alters the case entirely; you can keep pigs profitably whenever you have milk, and if you can shelter them it is all right. A dairyman can generally keep turning off pigs every three or four months.

T. J. FLEMING—I want to make a point here, being a dairyman myself, that I think it is possible to keep just that kind of a pig, that is, a September farrow pig, instead of a full grown one. The point I think is worthy of consideration from a dairyman's standpoint.

MR. WYLIE—Well, there may be something in what you say from a dairyman's standpoint, but on general principles, from any other standpoint, I would say no. If I were a dairyman I would never fed my pigs whey.

C. P. GOODRICH—Don't you think a little milk in connection will add to the value of the corn?

MR. WYLIE—Yes; it not only adds to the value of the corn, but it increases the value of the milk.

C. P. GOODRICH—I will read the result of a test I made a few years ago. I had some pigs that averaged 125 pounds each. I divided them up to experiment with. Feeding corn alone, one bushel made ten pounds of gain; feeding milk alone, 100 pounds of skimmed milk made five pounds of gain; it made just half as much gain as a bushel of corn; and feeding separately a bushel of corn and 100 pounds of skimmed milk and they will make together fifteen pounds of gain; but when fed in connection it made eighteen pounds of gain, which made twelve pounds of gain for the corn and six for the milk. Fed separately with hogs at four cents per pound it made corn worth forty cents a bushel and milk twenty cents a hundred; fed together corn was worth forty-eight cents a bushel and milk twenty-four cents a hundred.

QUESTION—At what age should a pig be weaned?

GEO. WYLIE—I would say a pig should never be weaned. If you feed your pigs in a proper manner scarcely any of them will suck at ten weeks old.

SUPT. MORRISON—How do you feed these summer pigs?

GEO. WYLIE—I feed them all they will eat.

SUPT. MORRISON—In what way?

MR. WYLIE—I feed them shorts and skimmed milk and a certain amount of corn.

J. M. TRUE—Dry, hard corn?

MR. WYLIE—No, sir; soaked corn. People make a great mistake in feeding young pigs dry corn. Now, I don't want to claim that soaking the corn adds anything to it at all, but you feed a young pig dry, hard corn and you will very soon cloy that pig of that kind of feed, his teeth get sore and he will not eat; now if you soak the corn it makes it more easy of assimilation, and the pig is always anxious for it; the pig will never leave any soaked corn.

C. I. BRIGHAM—How long do you soak it?

MR. WYLIE—Usually not more than twenty-four hours. The quality of corn differs a little in regard to that; it should be soaked until soft, but not allowed to sour or anything of that kind.

WELDON VAN KIRK—Would you soak rye?

MR. WYLIE—I never feed soaked rye; I usually grind rye because it makes such splendid slop; rye is one of the feeds I think it best to grind for very young pigs.

W. H. COLE—Can you tell me how to pick out a hog with a good quality of bone, one that will carry the most pork?

MR. WYLIE—The general appearance of the animal indicates the quality of the bone a good deal; now, you don't want too coarse a bone, and you don't want a bone that is too soft and spongy; you want a good bone but you don't want too much of it, and you don't want too fine a bone.

JOHN MARCH—How do you judge of what may be termed the essentials of a good hog; just give us the essentials and the non-essentials?

MR. WYLIE—One of the first things to go by in a pig is his head; if he is lying down and I don't like his head I never stir him up; never look any further Whenever you find a pig that is narrow between the eyes and has a long, sharp nose, you always find a hog that is never satisfied with what you give it, and it is always looking around the fence for a chance to get out.

MR. JOHNSON—You stated that breeding stock should be over one year old, from one to four; don't you think it possible to be successful with breeding stock less than one year old.

MR. WYLIE — Perhaps on the sire's side, yes; on the dam's side, no. The sow should be at least one year old when she has her first pig.

MR. JENNESS—Don't you think a hog should be slopped all the while?

MR. WYLIE—Yes, it should have a certain amount of slop.

MR. JENNESS — Well, do you think there would be profit in wintering shoats over, and clovering them, and slopping them?

MR. WYLIE — Yes; it would depend largely on the market, however, in regard to that. There is a point that farmers do not study closely enough, and that is the markets. If you will study the markets for the last twelve years, you will find that it has usually been better during the months of July and August than any other time of the year.

MR. SANDON—I would like to ask Mr. Wylie as to the relation of clover hay and raw potatoes in the winter, giving them three feeds a day and with slops. In the morning I would give them a ration of clover hay with slops, such as milk and house washing; at dinner I would give them a ration of oats, and at night I would give them their potatoes; is that a good ration?

MR. WYLIE — Well, I shouldn't call it the right kind of ration, but you can make the hogs live on that; it isn't a proper combination at all.

J. M. TRUE — What does it lack, Mr. Wylie?

MR. WYLIE — It lacks a little corn to begin with, and corn is the cheapest feed there is. If you are feeding in that way you would find this objection to that, you couldn't get them to eat very much of the clover hay, and there is too much of the potatoes.

MR. SANDON — I don't feed mine in that way, but I wanted to know if that was a good way.

MR. WYLIE—I have had the best results for a ration made up thus: One-third oats, one-third shorts, and a third corn.

C. I. BRIGHAM—How are the oats and corn fed; in what way?

MR. WYLIE—I never feed whole grain of any kind to hogs in a trough, because they bolt their feed. I feed the slops at noon, warm, and feed the corn at night.

J. M. TRUE—Couldn't there be a feed of potatoes given each day to advantage?

ANSWER — Yes, sir; in addition to this ration I feed my hogs three or four meals of mangel wurzels every week; I don't feed them, however, for any fattening qualities that they may possess, or anything of that kind, but to keep the system in good order.

T. J. FLEMING — Were those potatoes raw or cooked?

MR. WYLIE — I think it would pay if fed raw.

MR. SANDON — In the morning I give my hogs a ration of oats. At noon I give them their clover hay with their milk and slop and give a feed of bran and shorts mixed; at night I give them their potatoes and corn.

MR. WYLIE—That is a good ration.

T. J. FLEMING—Anything better than milk and corn for a hog?

MR. WYLIE — That is an awful good ration.

T. L. HACKER—I would like to inquire how you feed clover hay?

MR. WYLIE—I do not feed clover hay

to any alarming extent. I found that it was not very filling.

MR. SANDON—I first put the clover hay into a trough and then I take my shorts and feed and sprinkle over it before I pour my slops on top of it, and they eat it all and make a good ration out of it. My hay is cut very fine.

QUESTION—What breeds of hogs do you consider best for the average farmer?

MR. WYLIE—The breed that pays out the best.

J. C. MARTIN—What breed is that?

MR. WYLIE—I shall have to ask you to come up and see me.

EXPERIMENTS IN PIG FEEDING.

By L. H. ADAMS.

MR. ADAMS—Whenever there is a hog discussion on there is a tendency to levity, but I don't know why it is. It seems to me that there is no animal that we keep on the farm that has done more to lift the mortgages that have weighted the farms down than our hogs. Not only that, but there are many valuable lessons in breeding that can be obtained from swine, without wasting a life to find out the points that you are after.

Station Experiments.

Now we have been conducting some experiments as to the relative merits of corn meal versus other feeds, and I am going to give you some of our results. We are charged sometimes with being so intensely scientific that we can't come down to the practical on the farm. Now I have endeavored here to draw just as practical conclusions as it is possible to draw and yet keep on the safe side. On the farm we are often compelled to do not as we would like but as circumstances force us to do. It matters not how thoroughly we may be posted on the science of stock feeding, it sometimes becomes necessary for us to make the most of feeds we have on hand, even at the risk of feeding an unbalanced ration. Therefore, I will confine my remarks to a few vital considerations that every farmer who raises hogs is obliged to contend with, and shall endeavor to show when and under what circumstances a feeder may or may not depart from a strict observance of scientific principles in feeding with a certain degree of safety and without incurring disastrous results.

Corn to Pork.

In swine husbandry we have the great problem before us of how best to convert our great corn crop into pork, for that crop has not only formed the almost exclusive ration of our hogs in the past, but is bound to be so in the future, for there is no grain that we can raise with the same outlay that will bear any comparison with corn for the rapid building up of fat, and as we stand and look upon a bunch of broad backed, thick joweled hogs, we are inclined to regard with contempt the statement that corn is an unnatural or unhealthy diet.

Constitution First.

But we should not forget that fat often covers a multitude of defects, and, I will add, that some of our horse breeders of today have no more—if as much—reason to forget this fact than the swine breeder has. It is life, energy, substance, great powers of endurance, and capacity for resisting disease; in short, constitution, that we want, more especially in the horse, but also, to a greater extent than we now have, in our great American hog. In the mad rush and scramble among breeders to develop ponderous frames, the truth should not be lost sight of that the scales do not tell the whole story, and that continued neglect of a few fundamental principles in breeding and feeding can only result in disaster in the long run.

Breeding Animals.

It is very important, therefore, in swine husbandry, that the selection of breeding animals receive careful attention; only those possessing inherited vigor to start with; a rangy form, and strong limbs, that are calculated to hold up weight, should be chosen. When a sow has given evidence of possessing the desirable qualifications of a brood animal keep her. Don't make the mistake of breeding from immature stock.

An Experiment.

After the selection of breeding stock has been made, the one idea that we should ever keep before us is, to encourage the development of bone and muscle rather than fat, by the use of such feeds as clover, peas, shorts, oats and dairy waste. Don't pave the way to failure in swine husbandry, by feeding corn to the brood sows, and then have to fuss and worry every spring with a lot of weak, puny pigs, that are predisposed to weakness and disease. And, in order to impress the truth and importance of what I have been saying upon your minds, I will relate the life history of a litter of pigs that we raised at the Experiment Station farm last year. The pigs, seven of them were born May 24th, and weighed 18¾ pounds the day they were born. The mother of the litter was a cross-bred Poland China and Berkshire, twenty months old at the time the pigs were born, this being her second litter of pigs. She was a strong, rugged animal, and a good mother. The pigs gained 302 pounds 5 ounces during the first seventy days with their mother, which shows conclusively that the litter was all right to start with. The sire of these pigs was a full blooded Poland China, bred by, and purchased of, Mr. Geo. Wylie. The mother, while sucking the pigs, was confined in a large, roomy pen, with an earth floor, and she had constant access to a small outdoor yard. Her feed, and also that of the litter, when they got old enough to take an extra nourishment, consisted of corn-meal and skim-milk, in the proportion of three pounds of milk to one pound of corn-meal. The pigs were allowed to remain with their mother seventy days; they were then separated, and from that time on were destined to receive nothing but corn-meal. Here we have a litter of seven pigs, born right, and fed more rationally than the average farmer feeds his sows and litters, all thrifty and promising at the age of seventy days, and weighing 321 pounds. Now, mark the changes that take place during the following 140 days. For the first seven weeks after weaning, the litter was kept together, but fed entirely on corn-meal and water. Instead of going on and increasing the daily gain, as they ought to in proportion to the daily gain in capacity for taking and assimilating more food, we find it is just the reverse; for the seven pigs only gained 148 pounds during the seven weeks, or 6.9 ounces each, daily.

A Corn Ration Only.

At this time it was decided to select six of the most even pigs out of the litter, divide them into three lots of two each, and feed all of them on corn meal with what salt they wanted and rain water to drink, but to give one lot wood ashes and another lot ground bone meal, in addition to corn meal; the third lot was to receive nothing but corn meal and water. The purpose of the experiment was to feed them as long as they could bear up under that kind of a ration, and then kill them and study the effect of the feed upon the carcasses and viscera of the different lots. Thirteen weeks from the time the experiment commenced, the pigs that received nothing but corn meal had reached the limit of their power of endurance; it was with difficulty that they got to the trough; they were dwarfed in size, but excessively fat, and their appetites were failing daily. The pigs in the other two lots could undoubtedly have gone on a few weeks longer, by reason of the mineral matter they got from the ashes and bone meal, which, to a certain degree, supplied the elements of food lacking in corn, but so necessary to a healthy and symmetrical development of all farm animals. Fearing that one of the pigs, fed exclusively on corn meal, would die, it was thought best to kill them all at the same time in order that the different lots might be compared with one another.

Results.

After killing, the thigh bone, from the ham of each pig, was dissected and tested for its breaking strength. In the case of the pigs that received ground bone meal, it was found that the average pressure required to break the bones was 407 lbs. The bones of the pigs getting wood ashes snapped at a strain of 340 lbs.; the bones of the pigs that received nothing but corn meal gave out at a pressure of 306 lbs. After getting the breaking strength of the bone, they were burned by the chemist, in order to find how much mineral matter they contained. It was found that the bones of the pigs fed upon bone meal contained 109 grams of ash; the bones of those fed wood ashes had 99 grams, while the bones of those fed corn meal exclusively had but 89 grams. It will be seen at once that the strength of bone was just about in proportion to the amount of mineral matter it contained. The odd pig that was left after the six had been selected for the experiment was turned out into the barn-yard with others, where it got a variety of feed; it went on, and developed into a fine, large animal. The only evidence he gave of having received too much corn at some stage of his life was a little soreness in the limbs; it was very evident that the bones were not strong enough to support the weight placed upon them. It is proper to add that all of the pigs on this experiment had an outdoor yard in which to exercise; the yard was floored, however, to prevent the pigs from getting anything other than what was weighed out to them. Now, think of it, starting with a thrifty, healthy litter of pigs at the age of seventy days, it only took twenty weeks of exclusive corn feeding to reduce those pigs to a condition of utter helplessness. For the last two or three weeks of the experiment, the pigs on corn meal alone did not gain anything at all.

Lessons Taught.

Now, it seems to me that this experiment demonstrates clearly the necessity of first getting our pigs well born; second, the importance of providing the pigs with a variety of muscle and bone forming food for the first three or four months of their lives, or until they have been enabled to store up enough mineral matter within their bodies to permit of a full and normal development of the bone and frame, while you are engaged in the forcing process with corn, and nothing but corn, in the middle or latter end of the pig's life. The first week of a pig's life is the most critical and trying period of its existence, as it is also the most important to the breeder, for if the pig at this tender age lacks strength and energy to assert and maintain its rights, it will soon be brushed aside and outstripped by its mates, and the loss thus caused can never again be made up. Unless a man is especially equiped for the raising of early March and April pigs, he had better not undertake it, for close confinement in a pen that is always more or less damp, and lack of exercise, will prove fatal conditions to many, and start others on a squealing career for their lives.

General Suggestion.

Have the pigs come the latter part of May or the first of June; and you will find that it is easier and cheaper to battle with the cold at the latter end of a pig's life, than it is at the first. Provide the sows in the fall with dry and comfortable quarters, where they will have constant access to the barnyard; they will then take care of any grain that might otherwise be wasted in the manure. In case the sows were in a yard where steers were being heavily fed with corn, the sows should be taken out for they would then get too much heating food, and that is not what they want. They should have a sufficient allowance of oats, shorts, roots, and such slops as the farm affords; fed sweet, and not in the highly fermented condition it sometimes is, to keep them in a thriving condition, not fat. In the spring turn the sows in a clover pasture, if possible, and sow a field of oats and peas, for the sows and litters later on. The sows should be accustomed to being yarded every night, and then, as farrowing time approaches, they will naturally resort to their pens, which should be provided with a narrow shelf or fender around the inside of the walls, and 8 or 10 inches from the floor, to prevent the mother from lying on her young. A trough should be provided, where nothing but the litters can get to it, and if there is any skimmed milk to be had on the farm, it should be warmed to 90° or 95°, a little shorts or corn-meal stirred into it, and the pigs taught to drink just as soon as possible. As soon as I can get a pig to taking a little extra feed in this manner, I feel that I am well on the way to success. The feed should be increased as fast as the litters will take it, and the question of weaning them will settle itself without any interruption of their progress. And now with a strong, healthy, thriving pig to start with, we have got a shoat that we can force along on a field of peas, and top off with corn at any time during the following winter or spring without any ill effects resulting from the exclusive use of corn, and with profit to the feeder. Or, to state it in another way, the time to make preparation for a profitable hog is before he is born, for I firmly believe that there is more in the proper care and feeding of the sows, and having a pig that is born right, healthy, and thriving to start with, than any ration we can give them at the latter end of their lives, I care not whether it is balanced or unbalanced.

DISCUSSION.

W. H. COLE—Don't you think that you have set that a little too far down; don't you think the middle of April or the first of May would suit us better?

MR. ADAMS—If we could have them just exactly when we wanted them the first of May would be a very satisfactory time.

In regard to this question as to the quality of the bone, put to Mr. Wylie a few minutes ago, I wish to say that I think there is a great difference in the character of the bone. I do not think that a great big, rough bone is what we want. Now, in breaking the bones of these pigs I found that the largest were not always the strongest, but sometimes a bone would bend long before it would break; and seem very flexible.

SUPT. MORRISON—I should like to ask, after pigs have been confined to a corn diet for three months, if there is any use in feeding to make bone and muscle?

MR. ADAMS—It is possible that you can restore partially but never to their normal condition after a pig has been on corn for three months of his life.

J. H. WISE—Can a fatting hog be fed as profitably on corn meal exclusively as he can on that with something else with it?

MR. ADAMS—It is better with milk.

C. P. GOODRICH — How much corn will a hog of 150 pound weight consume in a day?

MR. ADAMS — From ten to twelve pounds a day.

H. ROBBINS—What will be the gain?

MR. ADAMS—Five to seven pounds of corn meal should make a pound of pork on a mature hog.

QUESTION—Do you mean a hog that has been fed all he can eat up to maturity?

MR. ADAMS—Yes, and then put upon corn meal and forced.

THOS. CONVEY—Do you advise feeding corn meal alone for fatting hogs?

MR. ADAMS—I do not.

GEO. WYLIE—You can't make a fat hog gain two pounds a day?

MR. ADAMS—I can a lean hog, a hog fed on nitrogenous foods, such as clover, shorts, etc., enough to keep him gaining.

GEO. WYLIE—At present prices would

you consider it profitable to grind feed?

Mr. Adams—No, sir, I wouldn't grind feed for hogs; I would prefer shelled corn rather than to grind it.

Question—Do you claim peas won't fatten hogs?

Mr. Adams—They will, when you turn them in where they can get all they want in a soft succulent condition, but I don't know whether the pork will be of as high value.

T. L. Hacker—I am inclined to differ on that point. I think the nicest pork that can possibly be grown is from peas, oats and milk; I think it is equal to fowl.

Mr. Adams—Mr. Hacker introduced two or three other feeds in connection with peas. My answer was in regard to peas alone.

T. J. Van Matre—I wish Mr. Adams would describe to us what he understands by a mature hog and when he would begin to feed corn to finish off?

Supt. Morrison—Maturity is an unfortunate phrase to use.

Mr. Adams—That question of maturity will depend on the breeds, one breed will mature quicker than another.

J. M. True—If you aimed to grow pigs to a weight of 250 pounds before selling them, at what stage of growth would you commence to ripen them for the market?

Mr. Adams—I should aim to get pigs to the market at the age of from eight months to a year old. The most profitable feeding is done in that period, and if the pig is fed as I urge it should be the first three or four months of its existence, with the proper kind of food so as to get that frame to growing and developing properly, you can with corn then, along at the eighth to the tenth months of that pig's life, lay on a sufficient amount of fat to command the highest price in the market and have the most valuable pork.

Geo. Wylie—Are you not mistaken as to the age? Isn't it rather under eight months than over eight months?

Mr. Adams—A fifty pound pig will gain more with less feed than a hundred pound one, and it increases as it gets heavier.

J. M. True—If a pig has reached a weight of 150 pounds, at say five months of age, without corn coming largely into its diet, at what time would you begin increasing the feed of corn, in order to have him mature at 250 pounds at about eight or nine months, as you have suggested?

Mr. Adams—If you do not desire to market your hog until he weighs 250 pounds, you don't want to commence feeding corn when he is five or six months old; don't feed it to him heavily or exclusively until the last eight or nine weeks before you get ready to sell him. But let corn form an increasing ratio from five or six months up to within eight weeks of the time you want to let him go, and then make it all corn, if you will.

Geo. McKerrow—How much should a good, well-bred pig gain every day from the time he is born until he is put on the market?

Geo. Wylie—A pound a day is a very good gain.

Geo. McKerrow — Then how old ought an average hog ought to be when he weighs 250 pounds?

Geo. Wylie—Two hundred and fifty days, but you can do a great deal better than that.

Geo. McKerrow—How much better?

Geo. Wylie—I have had pigs weigh 200 pounds at six months.

Supt. Morrison—At what age can a pig be turned off most profitably?

GEO. WYLIE—I think at about seven months; twelve months is too long.

T. J. VAN MATRE—Isn't it a fact that in the Chicago market well matured hogs bring a larger price per pound than lighter hogs?

GEO. WYLIE—Sometimes it is and sometimes it is not, and it is as often in favor of the light hogs as in favor of the heavy ones.

ORANGE JUDD—You will find there is a class of nice shoats, 190 pounds and downwards that sell at the same prices as heavy weights; the highest price is paid for large shoats, 150 to 180 pounds, and then you strike up above 300, from 300 to 350; from 200 to 250 pounds do not sell as high.

G. C. HENDY—Many of us when fatting a hog for our own use would like to have them weigh 250 pounds, but we would like to have a little more lean meat?

L. H. ADAMS—You will have plenty of lean meat if you bring the hog up on dairy slops, clover, peas, and finish it off with corn.

THOS. CONVEY—Has exercise anything to do?

L. H. ADAMS—It has something to do with it in this respect, that you can't hope for a normal development without proper exercise.

T. L. HACKER—In preparing a hog for your own family use, why finish off with corn? Why not be satisfied with a nice lean piece of pork?

L. H. ADAMS—Because the highest quality of beef and the highest quality of pork is that in which the fat is all the way through it, marbled, as it is called; it is that that makes the juicy, palatable article so much desired, and a you can't put it there with anything but carbonaceous food, like corn.

T. L. HACKER—Now, I have just killed five young shoats, weighing probably 180 pounds each; they were raised on oats and peas ground and they were not finished off, but the pork is finished off; it is just the kind of pork we can eat with a good deal of relish. I think if I had finished off those pigs with corn they would have been too fat. I am not speaking of pigs for the market now, but for family use.

ORANGE JUDD—We used to fat a great many hogs; they were kept on clover in the summer, and mast, of which there was plenty, and then finished off on corn, and we had the pork, the lean and the fat.

T. L. HACKER—For the last three years I have sowed three bushels of peas and oats to the acre, half and half, and I have reaped them and thrashed them just the same as I do oats, and for dairy animals I have them ground; for pigs and young stock I feed them whole, and the result is exceedingly satisfactory. Every dairyman will admit that oats and ground corn is a first class feed but it is not equal to oats and peas.

W. H. COLE—How many bushels do you get to the acre?

T. L. HACKER—Last year I got forty bushels.

HOW CAN WE MAKE PORK AT LOW COST.

By THOMAS CONVEY.

The Best and Cheapest Ration.

If asked, which is the cheapest hog food we can produce? I would unhesitatingly say, clover. If asked, which is the best single food? I would answer, corn. But in the combination of these two foods lies the security of the pork producer. You may say this necessitates exclusive summer feeding, not necessarily clover hay, and clover ensilage, now forms part of a ration for hogs in many portions of the state and is giving the best of satisfaction, especially where fed to mature stock, kept for breeding purposes, and some parties reporting that they have kept brood sows on good clover hay each receiving two pounds of corn meal per day in addition to the hay the latter fed without preparation of any kind, while this style of feeding is practiced quite extensively in the eastern part of the state, and by the very best class of farmers. Yet I can not speak of it from experience, but consider it worthy of trial. But, I can speak from experience in feeding grain on clover pasture, and I prefer corn, and can honestly say, it is one of the best, if not the very best way to produce pork at a low cost, and it is somewhat strange so few farmers avail themselves of its advantages. At present prices pork can not be profitably produced on an all-grain ration, and yet it is equally true it can not be profitably produced on an all-grass ration, but the person who has never tried feeding a limited amount of grain to thrifty hogs on a good clover pasture would be surprised at the results. The practice of many feeders of feeding milk to hog ons grass in the absence of a grain ration, is not to be recommended, while young pigs do not derive much benefit from pastures except through the exercise and contact with the soil, and yet when the weather is suitable it is the safest place to keep them, as old pens with their unhealthy surroundings, and bad atmosphere, are particularly injurious to young pigs. Winter feeding should be avoided as much as possible, especially the practice of keeping what are termed store hogs, when not kept for breeding purposes.

Early Pigs.

Early pigs, like early lambs and chickens afford the best chance for profitable feeding, they are capable of utilizing grain when it comes, and by liberal grain feeding, can be got in constitution to sell on the early fall market. The risk of losing winter pigs will prevent this practice from becoming general. Some feeders advocate having pigs come in the fall, carrying them over to the June and July markets. But the men who raise two litters a year from mature sows, claim this to be the way to produce pork at the least cost, also that they get the best prices. I have always preferred raising one litter a year, never weaning the pigs, but I have my doubts about its being the most profitable way.

Not Corn Alone.

In recommending corn and clover I would not advise their exclusive use, as no food comes amiss with the hog, and his diet should consist of cheap rations, when possible. But one thing should not be lost sight of, and that is he should make a reasonable amount of daily gain, for that represents the profit. And in the absence of it, there must be a daily loss, as the pig gains nothing by age if he does not increase in weight, on the contrary, he gets out of constitution, and this naturally interferes with profitable feeding thereafter. So the daily loss is not represented by the daily amount of food consumed.

Ignorance, or neglect of this principle is the source of more loss than anything else connected with feeding, and makes our meat products cost from 25 to 50 per cent. more than it should; without either pleasure or profit to any one, or anything concerned. The greatest possible daily income of weight, may not represent the greatest possible profit. We must consider the cost of a food as well as its nutritive value. Therefore, an all grain ration will not bear comparison with a mixed grain and grass ration. Pork made in this way is at a minimum expenditure of labor, and there is the least possible loss of fertility, this, of course, refers to pasturing, and pork made in this way does not incur the extra expense of keeping up animal heat during cold weather.

Roots and Squash in Winter.

In fall or winter we should strive to supplement or supersede a grass ration with roots, potatoes, squash, pumpkins, cabbage, apples, or any of these. Some of them are better cooked and mixed with meal, they should be fed in connection with grain, and in cold weather less of this class of foods are needed, but they should never be entirely dispensed with, variety in food promotes digestion and improves the appetite, and the more an animal can assimilate, the greater the profits in feeding, but in feeding animals for meat production it it is just the same as in the production of the butter cow or the trotting horse. The animal having the greatest capacity to acomplish the object for which it is kept affords the greatest profit.

DISCUSSION.

MR. JENNINGS—Would you feed corn with your clover?

THOS. CONVEY—Yes; if I wanted them to produce the greatest growth I would feed about one-third the ration.

MR. JENNINGS—What if you should feed more?

THOS. CONVEY—Well, they would cost you more.

MR. WEST—I would like to ask Mr. Convey whether in feeding skimmed milk to pigs in the summer he has to warm it?

MR. CONVEY—It is better to warm it in the summer time for very young pigs.

L. H. ADAMS—What is a good gain on clover?

MR. CONVEY—I always strive to get one pound per day and usually get it. I have had as high as one and one-fifth pounds per day; if you work more on grass and less on corn of course you may gain something less than that.

J. M. TRUE—Have you had any experience in feeding peas to hogs?

MR. CONVEY—Yes, I have raised peas and oats, as Mr. Hacker states, and it is a very fine feed to balance up with corn. I think it is cheaper than bran and shorts. I produced this last year 46 bushels to the acre, and the year previous I produced 40 bushels to the acre. There is one objection to it, and that is that it will go down on rich land.

H. P. RUNDLE—I would like to ask if the peas and oats ripen at about the same time?

Mr. Convey—Yes; I sow the late variety, but I believe any variety could be used. I drill them in with a drill. I sow the White Russian oats. I prefer the common field peas to the green peas.

T. L. Hacker—I was going to say that by sowing the oats I have no difficulty in the crop going down. I use the small pea. How do you cut the peas?

Mr. Convey—With a binder and bind them up.

J. H. Wise—In what proportion do you mix them to sow?

Mr. Convey—A bushel and a half of peas and a bushel of oats.

Geo. McKerrow—Do you ever use charcoal in feeding hogs, and in what does its value consist?

Mr. Convey—I feed charcoal and ashes to hogs in winter time, by leaving it where the hogs can get access to it without having it exposed to the weather.

W. H. Cole—Do you always keep salt where the hogs can get it?

Mr. Convey—I don't feed it; they get it in the milk from the dairy.

Question—Do you depend on corn to finish off with?

Mr. Convey—I depend on a balanced ration; I find a balanced ration will produce the greatest amount of daily gain.

J. H. Wise—Have you ever tried to feed rye to hogs?

Mr. Convey—But a very little; it is an excellent food but should be ground.

Question—What use do you make of your pea straw?

Mr. Convey—It goes in the oat straw and the cattle eat it equally as well; in fact it has more nutritive value than clover.

Mr. Jennings—Have you ever fed ground barley?

Mr. Convey—I have in connection with other feed.

R. B. Brooks—In feeding my hogs last summer, having no corn, I fed shorts and part of the time bran; they were running on good clover pasture. Do you think it would be cheaper to buy corn?

Mr. Convey—I think it would have been cheaper feed if they were running on clover.

Question—How do you manage to thresh peas without splitting them?

Mr. Convey—You don't need to run the cylinder close, and you won't split many of them; splitting them won't injure them for feeding.

John March—If they will take out the concave and put in a board the peas won't be split.

Mr. Convey—You don't thresh oats in that way though?

Supt. Morrison—What do you think of the comparative value of a bushel of corn fed in June or July, with hogs on a good clover pasture, as compared with feeding a bushel of corn, with the temperature twenty degrees below zero, as farmers usually do?

Mr. Convey—It is worth from three to five times as much.

Geo McKerrow—At what age and at about what weight do you prefer to turn off hogs for the most profit?

Mr. Convey—About six months old, and at a weight of from 200 to 250 pounds.

PROFITABLE PORK MAKING.

By E. M. SNOW, Waterloo, Wis.

Shiftless Management.

Several years ago having occasion to travel somewhat, my attention was called to the manner in which the hog industry was managed by farmers generally. It seemed to consist in allowing the young animals of any and all breeds to shirk for themselves until they were 16 or 18 months old, when they were enclosed in a pen from one to two rods square with ground for a floor; their shelter, if any, was a few poles laid across the corner of the pen, with a forkful of straw or hay placed on them which the first wind caused to disappear, and it was very seldom if ever replaced. The rains that came softened the floor until the mud was from six to ten inches deep, upon which corn was poured without stint. The soft feed was lifted over the fence and poured down among them, hoping that some portion of it might possibly reach the trough below, and he was regarded as an important factor in removing the mortgage upon the farm, and notwithstanding such rough treatment, he fulfilled the expectations remarkably well.

The time was, when the cow was wintered around a straw stack, receiving an occasional feed of hay, and water after the same manner, if convenient to the keeper; but later she was placed in quarters where the wind and frost were strangers, and the water she drank was warm to a degree of assimilation, and with this treatment she soon became one of the leading industries of the land.

Better Care, Better Results.

It occurred to me, that if the hog had been cared for as the cow had been, why should we not reasonably expect as much better results from him. Acting upon this idea, I proceeded to build a pen, consisting of an alley four feet wide with feeding room on one side ten feet wide, and pens 6x12 feet wide on the other side, with a space 10x12 for the purpose of preparing food, which should be placed in the troughs while the feeding room was empty, after which the door is opened and the pigs enter at once, and all have an equal chance as there is an abundance of room. The side pens are used for temporary purposes only, as the stock is expected to sleep out side the pens in sheds prepared for that purpose. The sides of the alley is composed of swinging partitions, for the purpose of depositing food in the troughs and entrance to the pens. When we desire to handle our pigs we turn them into the alley and by having a board little less than four feet long and about three feet wide, we are able to sort out and handle them as we desire. We would like to have a lane from the feeding pen, 11 feet wide and long enough to accommodate as many one-half acre fields of clover as we have brood sows, so that each litter of pigs may be by themselves for two or three weeks, or until they are strong enough to protect themselves from robbery by those that are older; after which time two or three litters may be turned together according to the capacity of the feeding pen. My method of feeding is to place the food in the troughs and then open a twelve foot gate around far enough to close up the lane leaving an open walk from the clover field to the pen; after they are done eating they are returned to the place from whence they were taken, the gate is closed, the process repeated until all have been fed.

This method of handling is very satisfactory, enabling the keeper to feed each pig what he desires him to have.

Salt, Sulphur and Ashes.

I prepared a box about three feet each way, open on one side with an inclined board reaching from the top, to within three inches of the bottom, and the same distance from the backside with a cover on top, in which I keep a mixture of salt, sulphur and ashes. It is always dry and accessible to the hogs from the open side. But notwithstanding this precaution, I met with a strange experience. A few pigs seemed to be weak across the back as though they were strained, nearly losing the use of their hind parts, with a sunken appearance and loss of appetite as well. I selected two of the worst cases and put them in one of the small clover fields and prepared a powder of charcoal, sulphur, and salt, mixed with milk. The result was that they soon recovered from this attack, took their places in the herd and were all right. Whenever I discovered any of the above described symptoms, I mixed salt and ashes with the food, which I finally adopted as part of a necessary ration, after which time those symptoms disappeared entirely. Last year I raised and fed twenty high grade Polands which weighed 200 lbs. (alive) at six and one-half months old, two of which I continued to feed until they were eight months old, at which time they weighed 260 lbs. each. Their main food was shorts for the first few months after which, oats were added and pumpkins also, through their season, but all that time I fed just corn enough to make them as fat as I desired and no more.

Clover, Corn and Pork.

Great care should be used that they they do not become too fat, for their growth. In 1884, I fed a bunch of fifty hogs which had been run on grass through the summer, until late in September, when I turned them into a field of clover, new seeding, about one foot high and nicely in blossom. The corn fed was fifteen ears each per day. The gain as to growth and fatness, was perfectly satisfactory, the meat was free from that oily softness that we sometimes find and seemed to be exactly what we wanted for home consumption. I have produced just as good results by cooking pumpkins to a pulp and thickening with corn meal, about one-half bushel of meal to one barrel of pumpkins, and would say here, that while we may give exact proportions of rations on general principles, the judgment of the master must determine for himself, from what he has in hand, what is best for his particular charge. If the hogs are increasing in size, without taking on a sufficient quantity of fat, the ration of corn is not sufficient and must be increased. On the other hand, if they take on fat too rapidly for their growth, the corn food must be diminished.

Cleanliness Necessary.

I know of a lot of pigs that were wintered in one corner of a barn basement which was warm; their nests were cornstalks that were cleaned out of mangers, after being fed to stock, and this was nearly or quite the only lot of pigs that escaped the cholera scourge in that neighborhood, thus showing how important it is that they should be kept dry, clean and warm. I have lost quite a large percentage of pigs, when I had the brood sows sleep on a plank floor through the winter, but since placing them in sheds, I have been fairly successful. I have never been able to satisfy myself why these things are so, but accept it as a fact, and govern myself accordingly. I have never had any trouble with mothers eating their young, except in one instance, she was enclosed in a small pen (6x10), in cold weather, fed with house slops and corn, and I could afterward see that something was lacking in the food she ate.

Time of Farrowing.

I would recommend the pigs to be dropped in May, while the mothers are on grass, at which time the weather is expected to be moderately warm and they are supplied with all the requirements of perfect health. The pigs should be fed for ten months, when they ought to weigh 300 pounds each and be ready for the March market which five out of twelve successive years the highest market price was paid and seven out of the said twelve years the highest market price was paid in September; but high feeding is not conisdered entirely safe in hot weather. The time was 1875 to and including 1886. I would breed from mature stock, retaining superior animals until their usefulness was ended, because I believe the pigs to be stronger and better able to resist disease.

Selection.

At the age of four months I selected a sow for breeding purposes from the lot of twenty mentioned above and placed her with two registered sows, all receiving the same care from that time on until seven months of age, when the grade weighed 150 pounds, while the registered ones weighed 200 pounds each. So I should try to get the best stock possible. A sow that rears pigs with bursts should be excluded from the breeding pen. When the farmers can with certainty produce the kind of pork as described above, I believe that the home consumption will be largely increased, because the intrinsic value is there and I think that should be the object sought for by every feeder in theland.

In the absence of milk, as with them in Nebraska, they must use flax seed, soaked in warm water until it jellies; this should be mixed with the food in sufficient quantity to produce a result which experience alone will show to be desirable. (It is just as good for colts.)

If ground oats are any cheaper than shorts, give them a fair trial. But I would not grind the corn but keep it for to balance the other feed. Mix the shorts or ground oats with warm water to the consistency of deep setting cream and add the jelly, or oil-cake meal in small quantities for three or four months, at the same time give them a clover run.

DEERFOOT FARM PORK PRODUCTS.

By **JAMES CHEESMAN**, Southboro, Mass.

The starting of this farm was the purchase of a country home by Mr. Joseph Burnett. He is a native of Southboro and having been successful in business in Boston, desired to establish his summer home there, and accordingly purchased this farm. The farm was run as

A City Man's Country Place,

until 1871, when Mr. Edward Burnett graduated from Harvard and enlarged the scope of the farm operations, bringing it into prominence as a business enterprise. He was so successful in this that the word Deerfoot, as a trade mark for butter and pork products, is known over nearly the whole country, and the demand for them is more than the farm as such can supply.

The Deerfoot business is divided into three distinct departments or heads. First, the farming proper; second, the creamery or dairy business; and third, the pork business. Each of these is in charge of a competent foreman and all under the control of the office.

Size of Farm.

The farm comprises about 300 acres, a little less than one-half of which is under cultivation, raising hay and other fodder for the stock. The rest of the farm is rough, stony and in some places covered with undergrowth of sprouts. Some three or four acres per year are reclaimed and added to the arable portion of the farm.

The farm is situated at four corners of the town's highways, about a mile and a half west of Southboro station. On it are located the family residences of Mr. Joseph Burnett, Hon. Edward Burnett, Mr. Robert Burnett and Mrs. Gardner, several cottages for the employes, besides the barns and other

Farm Buildings.

The farm buildings are somewhat scattered as the business developed from small beginnings, and new buildings were added as was necessary. The barns are all serviceable and have nothing about them different from what any common barn may have.

The buildings are grouped together for ease of supervision and for the purpose of convenience in the use of power and system. The dairy is at the end nearest the foreground and the pork business at the other so that no unpleasant odors from the hogs can effect the butter. The boiler and steam engine is in the centre, with the office and laboratory over head.

The Farm

is devoted to making milk and raising pigs. The neat stock includes about 80 head of Jerseys, Guernseys and their grades. The herd is led by two A. J. C. C. bulls, one sired by Eurotas Victor Hugo 15,689, and having considerable Eurotas blood in his veins. The other, Hillsboro, was sired by Lord Darlington 7,285; in addition to having a considerable amount of Darlington blood, he is also descended from the Duke of Argyle and Morjoram families. The farm is now milking 53 cows, the balance being young animals. Everything about the barns is the ideal of neatness; the stables are continually sprinkled with plaster and other absorbents. Much hay is cut, and this is a prominent article of feed, with corn meal, gluten meal and linseed meal.

Ensilage is being used now for the first season, a new silo 32x20 feet having been constructed during the last summer.

The number of pigs kept on the place varies, but it is intended to raise about 300 per year at the least, and we hope by greater economy in the waste products of the dairy to increase the number. The pigs are fed largely on the skimmed milk and butter milk from the dairy, and are also used to help in reclaiming the rough land. They are pastured on sections enclosed with movable fences, so that their runs can be readily changed. They are serviceable in turning over the soil, while adding to its fertility.

The Pork Business

uses about 20 hogs per day. Such as are not raised at the farm are selected by its buyers from the best dairy districts in New England and shipped alive to Deerfoot farm for final feeding and butchering. The most prominent of the well known products of this department are the Deerfoot sausages, which are known the country over. But a large business is also done in fancy bacon, lard, and in small 15, 25 and 50 pound tubs of family pork. Pig's feet are put up in glass jars, and some of the sausages are put up in two-pound packages, and some of the sausage meat is also put in two-pound packages in parchment paper. This building is also equipped with machinery for doing work expeditiously, with rooms for butchering, cutting, making the sausages, filling and chilling, packing them, trying the lard, smoking the bacon, and everything else that is needed. Everything is neat and clean about the premises. The pork products are so well known and so popular that they are shipped all over the country, to Montana, New Orleans and St. Louis, Chicago, Cleveland, Cincinnati, Boston, Philadelphia, Baltimore and other places.

When the hog troubles appeared a few years ago it was deemed prudent to reduce the number raised on the farm to within a hundred and to exercise extra care in our selections to avoid suspicion of disease.

Since then we have not fed so many on the place, but have induced a greater number of farmers to make pork for us within ten miles of the farm. Our object is to induce those we buy milk from to take back their own skim at 5 cents per can of 18 pounds, or 27½ cents per 100 pounds, and compound this with equal weights of bran and corn meal, using not less than ten pounds daily of the milk and a suitable quantity of the mixture of the bran and corn meal to suit the growing demands of pigs.

Generally we have tried to follow the teachings of Dr. Goessmann's experiments by choosing the highly nitrogenous feeds for their high manurial values.

Dr. Goessmann's food valuation of fodder articles per ton:

	Market cost.	Manurial value.	Net cost.	Feeding value.	Cost per lb. Nitrogen.
Fodder articles.					Cts.
Corn meal........	20.00	7.50	12.50	21.73	3.30
Wheat bran	17.00	14.50	2.50	22.92	2.21
Wheat middlings	20.00	10.75	9.25	22.82	2.73
Gluten meal......	24.00	17.00	7.00	34.49	2.11
Cotton-seed meal.	26.00	19.75	6.25	36.77	2.41
Linseen meal O.P.	27.00	21.75	5.25	37.99	2.50
" " N.P.	25.00	24.00	1.00	37.91	1.35
Timothy..........	12.00	5.50	6.50	12.06	2.18
Corn stover.......	5.00	4.80	.20	14.30	4.95
Sugar beets.......	5.00	1.15	3.85	4.17	6.47
Mangolds...... ..	3.00	1.10	1.90	2.95	4.85
Skim milk........	4.10	2.25	1.85	4.07	4.39

The above estimation of value is based on 4 1-3 cents per pound for digestible fat, digestible nitrogenous matter, 4 1-3 cents per pound, and non-nitrogenous 9-10 cents per pound.

This year we shall use a little Cleveland lindseed meal for pigs under 100 lbs. weight, after that we shall abandon linseed, leave out the bran when the pigs attain a weight of 150 pounds carrying them through to 200 to 210 lbs. On a mixture of skim milk and corn meal, and what they can pick up on their limited ranges on the rough land. We aim to produce lean meat by giving food of a close nutritive ratio, and free exercise on sheltered land. In summer we use movable pens rather than stationary buildings. In the fall we group the pigs together under the three barns where they have free range in lots of fifty to exercise on the long litter from the stable and the peat moss which we are now using in combination with plaster, as an absorbent. The gross cost of food and labor for one pound of pork with us at eastern prices of skim milk and grain figures from 5 to 5½ cents live weight. We estimate the profit of pork making on the value of the manurial residues of feed. This is one of the hardest lessons we have to teach the people who grow pork for us. They don't realize that corn meal is the most expensive thing we buy and that bran and linseed meal are the cheapest. If I tried in Wisconsin I should grow plenty of clover, barley and oat fodder and cut these up and mix them with corn ensilage, bran and skim-milk. Distance lends enchantment, and I suppose a paper from Deerfoot farm is considered by some, a little more spicy than some good hard headed pig-men in Wisconsin would offer. I want to swap. The New England States want to borrow the governor and Uncle Hiram Smith to teach us how to breed a business cow, and Prof. Henry and Theodore Lewis how to make healthy, sensible, nice eating pork.

The lesson we all have to learn is more faith in the few acres near our barns, to concentrate capital in fewer cows and pigs. To grind out less muscle on chores, do more thinking, use the scales every day, carry our pencils and note books all the time, and to know what every quart of grain costs, the cost of every bit of clover, corn, milk and pork raised on the farm.

Hoard, Morrison and Smith cannot save us if we do not learn our individual duty and do it. With such manhood and educational facilities to the square mile as you have in Wisconsin every farmer ought to be an expert in cows and pork. Make more bone and muscle for the pigs and you will always get enough lard. Never keep pigs longer than six to eight months old. Lean pigs, cleanliness and good faith have made our business and the same qualifications keep it together.

The Dairy Department

uses all the milk made upon the farm, and also such of the milk of the adjoining farms as comes up to the Deerfoot standard. The milk of 1,000 cows is used daily. The farm runs a car from Southboro to Boston every day, on which is sent much milk as well as cream, butter and pork products.

HORSE SESSION.

PRESENT AND PROSPECTIVE CONDITIONS OF THE HORSE MARKET.

By JOHN M. TRUE, Baraboo, Wis.

The Best Will Always Sell.

Few markets are uniformerly good.

Periods of general depression pass over the country during which all commodities suffer to a certain extent in their market value.

At other times dullness of market is noticeable with some given product, while others of a similar character even, are not affected. In the last mentioned case irregularities of prices may be almost always traced to the undesirable character of the commodity, or an overproduction, or oftener perhaps to a combination of these causes, since overproduction usually depresses the price of the poor product, without seriously affecting that of the better.

The farmer's market seems to be more at the mercy of circumstances than any other, partially on account of the varied character and quality of what he produces, and also from a failure or inability to make any studied observation of the law of supply and demand. Booms sweep over our agricultural interests, and we thoughtlessly rush from one enterprise to another regardless of the well established fact that such movements must lead to a reaction that will be fatal to the interests of many a bungling or thoughtless zealot.

The Horse Product.

For years no product of the farm has sold more readily, and at more uniform prices than horses. All kinds have had a market value. Good horses have sold high, while poor ones have paid well enough to encourage the scrub and low-grade producer to continue his work.

Horse breeding has had *its* boom, and colts are found in nearly every farm yard.

Of the entire horse product now in the hands of the Wisconsin farmer I estimate forty per cent. to be ostensibly roadster breeding, of an actual or prospective weight of less than 1,100 lbs., and of no special merit in style of movement; thirty per cent. of light or low grade draft-breeding, weighing actually or prospectively less than 1,300 lbs., and of draft and semi-draft formation and movement twenty per cent of draft breeding weighing, or to weigh upward of 1,300 lbs. and ten per cent of roadster breeding and possessing meritorious qualities of style, speed or sufficient size to make desirable carriage horses.

Good Horses Pay.

Horses are said to be low; indeed there is no sale for certain grades. It is safe to assume that 50 per cent. of our entire product represents this unsaleable class. I hear of no complaint of *no market*, or *low prices* from handlers of good roadster-bred carriage horses, or large, smooth, well-formed draft horses.

I have been criticised in the past, for placing so much stress upon size as a special consideration for the roadster breeding farmer. I have never wished, nor do I now desire, to divorce this quality from style and finish; but do believe that with this combination, little importance need be attached to speed. It makes little difference in value whether the horses trot in three minutes or four minutes, while the difference in price between 1,100 pound and 1,200 pound horses of equal style and finish is quite appreciable.

Increased weight also seems to be required by the draft horse market; 1,500 pounds being considered light enough for the big horse. But the market no longer pays a premium for flat feet, puffy or curby hocks and heads the size of a salt barrel. Indeed, it is getting quite sharp in its discriminations against these features that have been quite common with draft horses—quality is as desirable in a draft, as in a road horse.

The Horse That Sells.

With 50 per cent. of our product unsaleable, upon our hands, shall we still breed horses? No! and Yes! We should not breed in a way to add to the nonmarketable product. If through penuriousness, ignorance, or prejudice, we still insist upon perpetuating the little mongrel or the low-grade nondescript, if we breed at all, give up the work. There is no present or prospective market for you. But if you wish to raise horses as a *business*, can see the value of a dollar when well invested, as well as when in your fingers; like a good horse and know him when you see him, and are willing to admit that buyers who will pay long prices, and represent markets, know as well as you what is the best horse to raise—such men as you sell all their horses at satisfactory prices now, and always will find a good market.

Intelligent Breeding.

I see nothing in the character of the present horse market that seems suggestive of radical changes in the future. We are no more going to return to the horses of twenty-five years ago, than we are to other styles and methods of those days. The American people do not progress that way. The coming trotter must fly, above 2:30 cuts no figure now. Not many of us will raise phenomenal trotters. Good roadsters and coachers weighing 1,200 pounds and upwards will be among the best paying live stock products of the next ten years, and intelligent, widea-wake horse-farmers can raise them. We shall always want lots of good draft horses, and the best paying type will never be lighter or poorer than the market standard of today. The draft horse is the product of good breeding and feeding. His production is within the reach of all farmers who understand these requirements; and the income from good work here will represent as much clear profit as for any other line of farm work.

The Scrub Must Go.

Circumstances have conspired against the scrub, and he must go. Over-production has unmasked him, and without a buyer or friend he is plainly seen in his *undesirableness*. The farmer who raises horses for the market hereafter, will in common with his brother farmers who raise other products at a profit, find that he will succeed in proportion to the skill and intelligence he puts into his work. Competition will not soon be very sharp "up at the top," and the nearer he approaches that enviable position, the greater degree of success he may hope to attain.

THE BREEDING OF DRAFT HORSES.

By **ALEXANDER GALBRAITH**, Janesville, Wis.

An Important Industry.

Few departments of agricultural industry of this great country are more important than that of draft horse breeding, and none have been more uniformly profitable during recent years.

Croakers or prophets of evil, and also some of those interested in light horses, have sought to belittle the business, asserting that it was much overdone—that far too many heavy horses were being raised, and that a reaction was bound to set in.

Judging from the sayings of these wiseacres this reaction should now be long past due, and yet what do we find today? Why, the demand for first-class geldings or mares of suitable age, weighing from 1,400 pounds upwards, is still in excess of the supply, and the prices commanded by such horses have always been eminently satisfactory and profitable. Notwithstanding the general depression which prevails all over this continent, and the almost ruinous prices going for cattle, hogs and all kinds of grain and other farm products, it is a fact patent to all interested that good grade draft horses have maintained their value much better than anything else. In fact, they are about the only commodity on which the farmer is allowed to set his own price.

Quality and Size.

The quality and size of the average draft horse in this country today compared with that of 10 to 15 years ago show a wonderful advancement—an advancement which may be considered phenomenal—and I think nobody will dispute that this improvement in draft horses has been a source of benefit and profit to the whole country.

It is doubtless true that in certain sections of the country there may be too many draft stallions, and consequently the terms of service are so reduced as to make the business unprofitable to the stallioneer, but after all this is an evil which ultimately rectifies itself. What is needed is a more thorough distribution and also better horses. There are yet many counties in some of the Middle and Western States, not excepting Wisconsin, where not a single pure bred draft stallion can be found, and others where the people are only beginning to recognize the necessity of raising heavy horses, and appreciate the benefits to be derived therefrom.

Fewer Losses By Blemishes.

One great advantage which the draft horse breeder has over the breeder of road horses is that he has fewer sacrifices to make on account blemishes or imperfections. If a road horse or carriage horse has a deformity however slight, or happens to throw out a small curb or spavin or even a splint or gets cut on the barbed wire—or as friend McKinney used to call it, "That barbarous wire"—it invariably detracts greatly from his selling value. Not so with the draft horse—very little allowance having to be made for a small blemish on him. This enables the draft horse breeder to get a better average price on his sales. I don't wish to speak disparagingly of light horses—they occupy a very prominent and important part in the horse breeding of America, but as an illustration of my argument I will suppose a farmer raises six trotting bred or roadster colts and the same number of draft colts annually. The first named, as everyone knows, require considerable more care and attention, and an extra expenditure of time and money in fitting them for the market. Out of the six colts raised he sells perhaps two of them for $200 each, other two for $150 each, and two, which in all probability are more or less blemished or inferior, bring $100 each. This, I think, is a very liberal estimate, and leaves an average price of $150 per head. I have not taken any account of the chance there always is of producing a fast trotter. While such chance always exists, and doubtless lends a fascination to the business, the experience of at least nine-tenths of breeders generally is disappointing, and it is scarcely worth while making any kind of reckoning where the chances are so extremely small.

A Better Average.

The six draft colts may reasonably be expected to bring an average of $200 each, or $50 per head more than the roadster colts, and if allowance is made for the early age at which they become marketable, the small expenditure necessary to fit them for the market (as they need very little breaking, and absolutely no training) and the greater immunity from blemishes of all kinds, I think that farmers and breeders generally will agree with me that there is a difference of at least $50 to $75 on each colt in favor of the draft horse. I do not mean to say that there is no profit in raising light horses. On the contrary I am satisfied that with the proper kind of mares, bred to good sized, well-rounded and well-bred trotting or coaching stallions the farmers can raise a class of colts that will yield him an excellent return and find a ready market at all times at good paying prices. In order to do so successfully, however, a greater amount of scientific knowledge of the art of mating and familiarity with blood lines is necessary, and above all things the mares must be especially adapted to the purpose, being themselves well bred, of good size, form, action and disposition and thoroughly sound. Of course such mares are not too plentiful and always command especially good prices.

A Good Dam Necessary.

This question of the dam proves a stumbling block in the path of progress made by the average breeder of all kinds of stock, and it should be borne in mind that no animal of any great excellence has been the produce of a poor mother. Farmers should as far as they possibly can sell off their worst stock, but retain their best brood mares and try to increase the number of them as opportunity offers. In breeding his mares the farmer should always patronize the best stallion within his reach. A few dollars extra for a colt is money well invested when you get the best there is in the market, and remember that the board bill of a scrub is as high as that of the thoroughbred.

Pure-bred Stallions Pay.

The Farmers' Review of Chicago, after a very exhaustive investigation of the subject published last year, arrived at the fact that throughout the middle and western states the average price paid the producer of grade draft horses, that is, horses sired by imported or pure-bred stallions was $167. The same report showed that the average price for horses got by grade and scrub sires was only $97. These figures are indisputable and ought to teach farmers generally a wholesome lesson, although I rather think it is not necessary to apply the argument to the farmers of Rock county. The day has long since gone by for profitable breeding from anything short of the best sires that can be got, in any department of live stock.

Although it is my purpose to leave the discussion of this subject to others, I may anticipate one or two questions which may probably be asked.

The Horse That Pays.

First—Is the high grade draft horse the ideal farmers' horse? Every farmer must reply from his own experience. Many doubtless consider him the best horse for general purposes in the world, while others might prefer a lighter and swifter moving horse for farm work, and for long distance traveling. I am of opinion that the ideal general purpose horse, or horse suited for all kinds of work, is something approaching an impossibility, and that time will show the folly of attempting to breed for such. Draft horses are not trotters nor buggy horses, and never can become such without spoiling their valuable draft properties, and so with road horses. To make them pull heavy loads simply unfits them for the special work for which they are adapted. So long as grade draft horses are suitable for farm work, command a ready sale at good, paying prices, and the demand more than equals the supply, it is surely wise policy for farmers to raise them, no matter what their individual tastes may be.

The Best Will Always Pay.

Another important question which will naturally occur to men's minds is whether the present demand is likely to last, and what the prospects are for farmers selling to advantage the colts they are now raising. The best authorities agree that the number of horses used up and worn out on the streets of all the large cities is so enormous that, at the present rate of breeding, many years must elapse before the market can possibly become glutted with surplus stock, or that good draft horses will fail to bring a remunerative price. You will observe that I qualify that statement by saying good draft horses. There will always be a surplus of the poorer kinds on which there is no profit to the raiser nor credit to the handler of them, but if farmers will only stick to their best brood mares, or if they have no good ones try to get a few and breed them to the best draft stallion within their reach —if they do this consistently, and use ordinary judgment and care in this business, they can hardly fail to make a success of, and profit from, the breeding of draft horses.

A WORD ABOUT COACH HORSES.

By A. O. FOX, Oregon, Wis.

Horse Breeding.

The business of horse breeding in Wisconsin is in its formative period. Within ten years vast blocks of money have been invested in the business; until today the horses of our state are assessed for more money than all the cattle and sheep and hogs taken together.

The time has come when we no longer can afford to breed promiscuously; great deliberation must be had in the management of this vast property, if it is to mean a future continuous, financial success for the farmers of our state at large.

The problem of selection, is the one of all, which we must now study, and upon our comprehension of which, must depend our future success as breeders.

The bright sunshine of intelligent thought, must pour its grateful rays through the dense fog of our stable atmosphere. The day is gone forever, when the farmer can stoop to listen to the senseless harangue of the cross-roads "hoss-man," who, bloated with his own ignorance, pompously seek to extoll the qualities of his own stock, by malisciously running down the stock and character of his neighbor.

The Breeder, Must Read and Study.

The farmer of today, who would be a breeder, must read and study, and know for himself the lines of breeding best adapted to his purpose, and to be able to discover at a glance, whether the horse is bred as he requires. He must be able to accept or reject upon his own judgment, and to know that the class of men who stay back in the old ruts and ridicule his choice, are themselves away short of the standard. Like the old mare of Bobby Burn's "they are relicts of the past, they're old has beens, they're a be dil'd wie the spavie in their heads.'

As a tribute to the memory of this abominable class of men, well may we join in the sentiment of Junius, in his celebrated letter to the Duke of Grafton, that "we owe it to the bounties of Providence that the deepest depravity of the heart is sometimes strangely united with great confusion of the intellect."

Draft Horse vs. Trotter.

For the past twenty-five years the American horse breeders have been bent upon the production of two extremes, the heavy weight draft horse and our most wonderful American horse product, the light weight, low-striding trotter. These both have their useful spheres, but in the mad and indiscriminate rush for their acquisition, there has been produced in the one extreme too many big, lifeless, flat-footed, soft-jointed bullocks, with legs full of coarse hair, of little utility and very short-lived; and in the other extreme we have too many short-necked, narrow-chested, nervous little trotters, whose ability to trot is only demonstrated after the expenditure of a snug little sum of money, and which, if they cannot trot, and trot fast, are of very little use to the farmer who had raised them, and must be kept at further expense, until they can be marketed as roadsters at about six years of age. I am well aware that I am on dangerous ground in thus expressing myself, but I am certain that the majority of conservative breeders will endorse my statement, that the breeding of the typical trotting horse for profit, is a very hazardous business for the general farmer to embark in, *except he be unusually well posted in pedigrees and possessed of considerable spare capital, a cool head and unerring judgment.* (Bear in mind my exceptions.)

Coaching Horses.

Progressive breeders have begun to realize these two dilemmas and they are casting about for the material, with which to establish a class that shall combine to a great extent, the utility of both kinds, without some of their objectionable features; that will meet the popular demand for coaching horses, and that will at the same time perform their full share of farm labor from the time they are three or four years old, until sold off the farm.

In offering to the farmers anything digressing from the common draft horse, there is one important element which this horse must possess to a great degree in common with the draft horse, or he will not be acceptable, that is, early maturity. The farmer who lives in the great corn belt on lands worth from $40 to $75 per acre, cannot wait five or six years for his horse to reach a remunerative age, and pay taxes and interest on the investment. His horse must begin at three or four years of age to perform the labor of the farm; he must at that age have attained suficient size and substance to meet the wants of the general public. He should at four years old stand 16 to 16½ hands high and weigh in plain flesh 1,250 to 1,350 pounds. He should have a smooth, well-matured body; strong, clean limbs, with plenty of bone; and not a sign of coarse hair about the limbs or feet. The feet must be of the very best, for in this class of horses above all others, where fine knee and hock action is required, there must be a first-class set of feet to sustain it.

In producing this class of horses, where shall we find the best material? If it were not for the lack of the element of size and its early maturity, I should believe that we should find better results in careful selections among the largest families of the American standard trotting-bred horse than from any other source.

The American Trotting-Bred Horse.

We find among the American trotting-bred horses some with high class pedigress, that combine a strong standard inheritance with the further attributes of size, style and color with sufficient of the right sort of action; but upon inquiry about the individual we find his qualities not common to his family, and that he does not impart his size and style to his get.

There are a few instances where our best bred American trotting sires have been celebrated for their size and style of their get. Notably among these are Edwin Forrest 49, Mambrino Patchen 58, Harnson Chief 3841, and Indian Chief 832. The Kentucky Hylanders have also produced many fine carriage horses·

Undoubtedly among the get of these horses and their descendants are to be found as fine specimens of coachers as are attainable, but there are so few of of them that if all were put together, they would not equip more than two or three breeding establishments, and they are not, therefore, as a class, within the reach of most of our farmers. It is worthy of notice that in looking at the breeding of these named horses, we find a very strong impregnation of thoroughbred blood, especially on their dam's sides. This coupled with the fact that the best coachers produced in Europe, are strongly of thoroughbred origin, may be of value to us in making our selections.

The Dam.

The mares which we have within our reach to breed coachers from, are lacking more in size and bone than in any other quality. Trotting-bred mares can be found in nearly all sections with fair style and action, but they are too small and fine in the bone. It is fair to assume that in breeeing for coachers the majority of breeders will use this class of mares because they are the most common and easily obtained, and as a rule the graded draft mare will not be found to possess the ability to reproduce sufficient style and action. Few can afford to import or buy the imported mares. When they can be found there are no better mares for coach horse breeding, than our largest trotting bred mares, but they are scarce and are now held in such high esteem, that they are quite as high priced as the best imported mares.

The Stallion.

In selecting our *sire*, therefore, for crossing upon these medium sized mares we must look sharply for plenty of size and an abundance of broad, clean bone. He must at 4 years old stand 16 to 16½ hands high, and weigh in plain flesh 1,300 to 1,450 pounds. His color must be clear and rich and without bad marks. His shoulders should slope gracefully back, and he should stand well up in the withers. He should carry a lengthy, well-arched neck surmounted by a cleanly-chiseled head free from meat. He should have a clear, full, expressive eye and the visage of a thoroughbred. His back should be of medium length, not too much inclined to arch, and coupled strong in the loins to a long, smooth hip. His tail should come out well up and float gracefully behind when in motion. He should have a good depth of girth, and a well sprung barrel. His limbs and feet should be absolutely sound, not too long between the joints and not too straight in the hind legs, that he may have his feet well under him, and an easy, graceful hock action. His action should be high, bold and square, and with sufficient speed to roll off from eight to twelve miles an hour with ease and grace. His disposition should be spirited and intelligent.

The American Trotter.

If, in making this selection, we can find a predominance of these qualities, in a high-bred American trotter, with the *ability* to *reproduce* them, I believe we have the best to be had.

If, on the other hand, we are to look abroad, among the European breeds of coachers for our sire, we must keep clear of the thick-chopped, meaty-hocked, drafty sort, and look sharp for high quality with purity of action. Many of the imported horses offered us are very unevenly balanced in their action and are not level. They may lift themselves square in front, and appear well when approaching, but when once their hind end is turned there is noticed a lifeless swinging of the hind parts entirely out of keeping with their forward action; in others with hock action almost to the extent of stringhalts we see a stiff bending of the knee, and bad dishing in front. In many the tails set on too low in the rump, a very bad fault in a carriage horse.

The French Coacher.

Among the several breeds of imported coach horses offered us, I believe the French coacher to be the best adapted to our needs. He matures very early into a large horse, and while possessing wonderful substance and bone, he still has preserved the high finish of his thoroughbred ancestors, and his action when in motion is the most perfect and most evenly balanced of any of the imported breeds.

The question as to whether the French coacher will reproduce himself on our mares, cannot yet be said to have been fully demonstrated; but it is rapidly reaching that point. Many who have been making this cross for the past several years are highly pleased, and careful observers who have been watching the results, are now beginning to put their money into it, in a manner which shows their convictions.

A Bone and Muscle Ration.

But whatever sire we use, I believe there is still another important element, the full recognition of which is essential to our success; namely, the kind of feed with which to mature our colts, so as to assist in the development of a large active horse with clean, strong bone, and well muscled throughout. If we may hope to avoid the meaty, lifeless, soft-jointed, round boned sort; if we may expect to develop the bones and muscles of our horses to the greatest strength and soundness, we must see to it that our colt's food is of the bone and muscle-forming sort.

The recent experiment made in hog feeding by our Prof. Henry, of Wisconsin, by which he shows the wonderful effect of nitrogenous foods upon the strength and quality of the bones, and the amount of muscular tissues, is a timely admonition to the western farmers, that if we wish to grow valuable horses, it must be done with less corn, and more of such foods as will give a uniform and even development, that at four years old will produce a strong sound, whole horse.

CAN THE WISCONSIN FARMER PROFITABLY BREED ROADSTER HORSES?

By JOHN L. MITCHELL, President of State Agricultural Society.

If Mr. Morrison had consulted me about the soundness of a certain horse, my opinion would have had weight, because I deal daily with horse infirmities. A moot point in pedigree, also would have found me fairly well informed. But the economic question—"Can the Wisconsin farmer profitably breed roadsters?"—I am at a loss to answer with authority.

Recreation Exercise and Profit.

Horse raising and horse driving have been for me a matter of recreation, exercise and health and not of pecuniary profit. I have never overhauled my horse accounts for fear that the balance would be on the wrong side and thereby mar the pleasures of the pursuit. Mr. Morrison's query, however, has led me to a little horse introspection. If not tedious I will give some figures. During the last three years I have sold for cash (no trades nor ballooned prices), 18 head of trotting bred animals, as follows: Four aged mares at total of $2,700; 4 four-year-olds, at $4,750; 1 three-year-old at $1,750; 3 two-year-olds at $1,350; 4 yearlings at $740, and two weanlings at $1,100, making, the all told, $12,390, an average of $688 per head. Eight of these animals were purchases which, on trial, I thought it advisable to dispose of. The remaining ten were of my own breeding. The average age of these last, at the time they were sold, was 1½ years and they brought an average of $424 per head. With the exception of an aged mare and 3 four-year-olds they had never worn harness. They were sold on their pedigree and individual promise solely.

On their face such prices look profitable. On the expense side, I find that I paid $850 in stud fees for these ten animals. I carry thirty head of horses, more or less. They cost me in board and wages for the men, in oats, hay and straw, shoeing, harness, in round numbers $3,000, or $100 per head per year. Then there is interest on a hundred acres of land used for pasturage; interest on money invested in stock and buildings. After figuring this all up I find that my colts at 1½ years stand me in $300 apiece, leaving $124 to the good. Something should be donated for death, disabling accidents and veterination in brood mares. Allowing for this, I still find myself ahead in the breeding venture, with all the fun, fresh air and the pleasures of hope thrown in.

Roadsters at a Profit.

With me, extravagant sums have been paid for brood stock, little attention has been paid to economy in management and no especial effort has been made to advance sales, or obtain high prices. Having this in view, I am convinced that the farmer of Wisconsin can raise roadsters at a profit. But to do so, he must give the business close personal attention—neglect and preventable accidents soon ruin the business. Above all must he have a liking for the pursuit, a natural gift in that direction.

Wisconsin winters are longer than in more southernly states, where horses can be pastured to advantage. But to counter balance this we have cheaper feed and a more healthful air. The neighboring state of Michigan is situated very much as we are in the matter of climate and market. Should Mr. Morrison ask a Michigan farmer the question which he has put to me, he would be answered in the affirmative, without hesitation. The production of trotting horses is a great industry in Michigan—one that pays handsomely.

It is true, buyers do not flock to Wisconsin as they do to Kentucky, with over-fat purses in search of would-be world-beaters. Still, we have a steady remunerative market for sound, enduring, speedy roadsters. The supply is far from being up to the demand.

Richard Richards.

That a Wisconsin farmer can raise roadsters profitably has been demonstrated by the late Richard Richards, of Racine. He settled in that county, at an early day. He had little, or no capital. His horse beginning was small. His foundation of stock cost him hundreds where others expended thousands. But he was a genius in his way. Through the breeding of trotters he accumulated a snug fortune and achieved a national reputation. His methods are instructive. To mate with the common run of mares, he started with a horse called Bellfounder—a horse of size, finish and action, to Messenger and Ziomed. To breed to Bellfounder's daughters he went to Kentucky and bought Swigert, by Alexander's Norman, dam by Mambrino Chief. Swigert proved to be a remarkably successful sire. He has been of great value to this state and the whole northwest. To put the finishing touch, Mr. Richards purchased an inbred Hambletonian, Alden Goldsmith. In blood lines, Mr. Richards did not follow the fashion—he kept a little ahead of it. He was prophetic. But he was never blinded by a pedigree. He insisted upon having a horse as well. Him he selected with unerring eyes.

The Purse-Winner—A Will o' the Wisp.

While I am confident that on the cheap and fertile lands of Wisconsin and in its salubrious climate, roadsters can be raised profitably, I do not advise the farmer to try his hand at producing the track trotter. He will waste his midnight oil in dog-earring the 2:30 list. The purse-winner is a will o' the wisp which he will capture only in his dreams. There is not one in a hundred of the standard-bred trotters that shows enough natural speed to warrant the costly experiment of track development, of those that do, not one in a hundred ever earns his oats in actual races. The prices paid for the Axtells and the Sunols are dazzling, the thousand of failures are lost in obscurity.

The Wisconsin farmer need not face the financial result of the breeding of fine horses, providing he applies himself faithfully to the business. The horse breeder's calling is a high one. Let him bring to it not only his intelligence, but his conscience. The handiwork of the manufacturer perishes and leaves no trace behind. But the horse breeder builds for all time. Let him therefore, devote himself to the creation of a type of horses possessing beauty, action, soundness and good sense, so that to the remotest generation, they may carry their owners with pleasure and safety to the end of the road.

SUPT. MORRISON — The title of the next paper is, "Wasteful Management of Farms and Lazy Acres, the Cause of Hard Times in Farming."

This paper was prepared by Hon. Hiram Smith, who had hoped until recently to be present, but on account of illness is prevented.

More to Regent Smith than any other man are the farmers of Wisconsin indebted, not only for the Experiment Station and its efficient work, but also the Farmers' Institute. Months before an institute had been held, they were patiently outlined by him and with confidence in the intelligence and enterprise of our farmers, he felt that they would be successful, and from the richness and fullness of his experience he has always been willing to give the best he had to advance the agricultural interests of the state. Mr. H. C. Thom will read the paper.

H. C. THOM—It will probably never be my lot to again stand as the representative of a man who has a reputation such as Hiram Smith has earned in Wisconsin, and it does me much honor to even read a paper that he has prepared.

WASTEFUL MANAGEMENT OF FARMS AND LAZY ACRES, THE CAUSE OF HARD TIMES IN FARMING.

By HON. HIRAM SMITH, Sheboygan Falls, Wis.

Leaks and Wastes.

Mismanagement in dairy farming and unproductive acres, is the procuring cause of most of the wide-spread depression now so loudly complained of, by the great majority of dairymen in this and other localities. The annual waste of fodder on the large majority of farms is often equal to the amount utilized. Mr. Horace E. Stockbridge, director of the Experiment Station of the state of Indiana, says in Bulletin No. 29, that "careful inquiry and observation extending over the entire state, forces the inevitable conclusion that as much nutriment in the form of fodder is wasted every year as actually finds its way into the digestive systems of the farm animals of the state." Let us pause and consider for a moment the deep significance of this statement if it is true. It is very easy for the careless and unthinking farmer to dispose of the unwelcome charge, by saying I don't believe it is true, but the careful and observing dairyman has no question of its entire truth, many intelligent dairymen know from their own bitter experience that the statement is a very mild one.

Criticise Thyself.

Many farmers are very ready to ask questions of others and this is all right, but real progress begins when we ask questions of ourselves, when a man begins to talk to himself in earnest, made more earnest, when total receipts from the farm, are less than the legitimate expenses of the family, a man in this condition is not apt to have much nonsense in his questions, or answers. The man says to himself, I have eighty acres of land and I have never been able to keep more than fifteen cows, and these cows average about $30 per head, total receipts $450, and I have to pay one hired man eight months, his wages and board cost not less than $150, leaving but $300 to pay taxes, farm machinery, repairs and board and clothe the family. I tell you, that my wife and I work more hours and for less wages than any miners or operatives that ever struck for higher wages. Again this man says to himself, I have this farm, and have always worked at farming and don't know any other business, what shall I do? The capital I have invested in the farm don't bring me in anything. I don't even get good wages for my work, and nothing for the hard work of my wife, not even good clothes, no recreation and but little reading matter for the family, I know it is hard and the question for me is: Is this condition of things a positive necessity? I know that some farmers keep more cows than I do, they keep double the number on the same number of acres, and I have heard that some dairymen keep forty cows on eighty acres, but I don't believe that, but if I could only keep twenty-five cows, it would bring in $400 more than I now get and that would want only one more milker, and my wife really needs a good hired girl, and that would make all the milkers we would want.

Success and Courage.

The man begins to take courage, and says to himself $300.00 a year more and only the expense of a hired girl, and we ought to have the girl any way, if we could afford it, now the main question is how can I manage to raise fodder for ten cows more? It is the fodder I want, because the skim milk or whey from twenty-five cows will make pork enough to buy the bran or oil meal I ought to have. Now I have read or heard somewhere, that this large fodder corn will produce fifteen, twenty, thirty and sometimes forty tons to the acre. Now I don't believe a word about thirty and forty tons to the acre, but perhaps I can raise twelve tons. It is said by many dairymen that a cow will eat about fifty pounds of green corn or ensilage per day, so I see by this that an acre of corn fodder if it only produces nine tons will winter two cows, and if it will produce thirteen and one-half tons per acre it will winter three cows. Now I have made up my mind in talking to myself that I will send off and get a sack of sweet corn, two and a half bushels, and that will plant ten acres. I will try it any way. The relation of this imaginary case may seem to some a trivial affair, but it is the true history of hundreds of progressive dairymen throughout the country, it is the most important step the man has ever taken in his farm life, and becomes a memory in after years, as the turning point from penury to prospérity.

On the Up-Grade.

Now mark his subsequent history if he is a resolute man. He planted the ten acres of fodder corn, and in anticipation of the possible sucess of his new departure, he raises ten heifer calves, the corn proves a large crop; and by the first of January he finds he can sell $200.00 worth of hay and still have plenty of fodder; with the $200.00 from the sale of hay, he buys five cows, so that he is milking twenty cows the first year after conversion to improved methods of farming. The second year his ten heifers are in milk and he is milking thirty head, and he plants twenty acres of corn, and plows up ten acres of his old pasture, and sows to winter rye, clover and millet for soiling, when pasture is short, thereby keeping up the flow of milk so that his thirty cows average a production of forty-five dollars each, raising the total receipts of the farm to $1,350.

A Brighter Picture.

This is a true history of hundreds of dairymen in the state, who have had the sense to change the old methods of pasture grass for summer, and mainly hay for winter. What is the conclusion of the whole matter? It is this, in place of nothing as net receipts under the old method, he now has $350.00 at least, his land is growing more and more productive, his cows are grading up to larger production, he has raised his wife from a mere drudge, to her rightful prerogative, a well dressed, good looking, agreeable companion, he has kept one more boy and girl on the farm, he is more self reliant, more independent, a bigger and better man. Is there a man present that ever knew a man that raised good fodder crops, carefully preserved them and fed them to his own stock without waste, that was a poor man? One thing the timid or inexperienced dairyman should not forget. That if the skim milk or whey from fifteen cows, will raise calves or pork enough to buy the bran and oil meal for fifteen cows, then any increased number of cows, thirty, fifty or one hundred will do the same thing, cultivating and enriching lazy acres, and the cultivation preservation and final utilization of the fodder crops, is the keynote to successful farming.

BEEF SESSION.

Supt. Morrison—This is probably the last opportunity I shall have this winter of saying a word in justification of the Farmers' Institutes. I find that there are many farmers scattered through every county who seem to be prejudiced against the Institutes. Why, bless your hearts; it is the development of your special vocation. Every farmer in the state should be proud of this awakening, and if it does not come up to their ideas of Institute work, if it does not deal with the practical questions that confront them every day upon the farm, they are the very ones that ought to take hold and make it what it should be. Itseems to me a man has not got to have much forecast to look into the future and see that unless a work of this kind is fostered and encouraged, the farmer is going to be nothing but a laborer and in time nothing but a serf and peasant. If the farmers of Wisconsin do not themselves wish to elèvate their business and vocation, the business men and professional men certainly will not help them to do so. I have been upon a farm nearly all the days of my life, and all the hope and pride I have is in the farm, and I would like to see the farmers of the state of Wisconsin think so much of their business and become so well posted in it that they would be proud of it, proud to say that they are farmers, and throw into it all the efforts, all the study, all the attention possible, and then it is going to rise right along with them.

I want you to remember there is no politics in a farmers' institute, any more than in a Sabbath school. They are intended to train the farmers of the state in such a way that they will be able to stand upon their feet and express their views in reference to farming matters, and just the moment they become men endowed with thought they become God-like, and then they will avail themselves of the privileges and rights that belong to them. Consequently I don't want the farmers of the state to throw stones at the work, but take hold of it and make it what it should be, and when we come to have a thousand institutes scattered over Wisconsin, and perhaps a dozen or more in this county, and the farmers come together and pool their experience, then farming will become a profession and we will be proud that we are farmers.

The first topic that we will introduce is not on the programme, but will be presented by Mr. J. M. Smith, President of the State Horticultural Society. He is going to tell you how he produced 1,736 bushels of potatoes on four acres of ground.

J. M. Smith—Before I read my paper I wish to say a word in endorsement of what our friend Morrison has said. We all of us know what he is and know the work that he has been doing, and sometimes when I read in some of my agricultural papers how the farmers are oppressed it makes me tired; it makes me sick and out of patience. Whose fault but our own is it that we are dumb. We don't understand our business. We don't do what we might do; we don't do what we ought to do; we don't do what we can do; and these institutes are for the purpose of making us helpful to one another, and the man who writes or talks against them, it seems to me, is hurting himself a great deal more than he is hurting anybody else. If we only work together we can make our lands worth a great deal more by learning the value of our land. There is no man knows the value of his own land. I don't believe there is an owner of a ten-acre piece of land in Wisconsin that knows the actual value or worth or possibilities of his land, the worth that can be brought out of those acres for himself, and for his family and for his friends. And that is what the institutes are for, to teach us to work them better and to make more out of them for ourselves.

POTATO EXPERIENCE.

By J. M. SMITH, Pres. of Wis. State Horticultural Society.

How He Produced 1,736 Bushels From Four Acres at a Profit of $355.77.

For a good many years past my crops of potatoes have, as a rule, been very good. For a number of years I have been very anxious to test the different kinds of potato fertilizers that have been advertised at the east, and see how they compared with those I have used for these many years on my own place. Last spring, when the American Agriculturist offered its own and the manufacturers' premiums for the best acre of potatoes, I concluded to make the long desired trial and watch the results. Selecting four acres of land suitable for the purpose, for convenience's sake, I designated them plats No. 1, No. 2, No. 3 and No. 4. They lay side by side. Soil is as nearly uniform a nature as can be found, and is a dark, sandy loam, with yellow, sandy subsoil. It was originally a fairly good soil and has been manured heavily every year for a number of years past. It has also had numerous crops taken from it. Each plat was measured off and staked and marked by our county surveyor. The four plats were all treated exactly alike, with the exception of the fertilizers.

Systematic Work.

A strict and careful account was kept on the different dates at which the work was done, and of the expenses of the work. They are as follows: April 23—the land was in first-rate condition to work, and we commenced plowing it about eight inches deep, and finished April 26. The land was all thoroughly surface-drained and most of it thoroughly under-drained. Commenced harrowing April 26 and finished April 29. After the land was plowed, and before any harrowing was done it was manured as follows: Plat No. 1 had twenty loads of composted manure spread upon it. The loads contained about half a cord each. Plat No. 2 had eighty bushels, heaping measure, of unleached wood ashes. No. 3 had 1,500 pounds of the Bowker perfect potato fertilizer spread upon it.

Plat No. 4 had 1,500 pounds of the Mapes potato fertilizer. All was thoroughly harrowed in.

The Kind to Plant.

Now came the very important question of what variety should be planted. In competing for a premium, will it be best to select some of those tremendous growers and yielders, but which are not in reality merchantable, some of them in fact of no value except for feed to stock, and not much there, or in preference some good and salable variety, and try to obtain a large yield of fine and merchantale potatoes? I chose the latter course, and planted the entire four acres with the Early Ohio. The land was marked off in rows thirty inches apart, and the potatoes were planted in drills, one piece in a place, about twelve inches apart. The seed had been cut to from one to two eyes, except at the seed ends, where there were sometines three or four eyes upon a piece. The seed was of my own growing. I have for some ten to twelve years been selecting the finest specimens of this variety for planting, with excellent results, and did not vary my practice in this case.

Amount of Seed.

Commenced planting May 1 and finished May 4. The potatoes were weighed after being cut, and the average was 10 bushels 1 pound per acre. About the same amount of seed was used upon each acre, and was planted about three inches deep. May 27 the potatoes began to show sprouts through the ground, and they were well harrowed. June 15 the potatoes were cultivated and hoed. June 25 they were cultivated and hoed. In both cases the hoeing consisted in merely destroying the weeds in the rows, that could not be killed with the cultivator. The above is all the cultivation they received. It was intended to go through them once more, but very soon after the second cultivation a shower came, accompanied by a severe wind, which spread the tops over the ground so completely that I feared doing more harm than good by any further cultivation, and they received no more.

Level Cultivation.

The last time they were cultivated the shovel was put on the cultivator, and a very slight furrow, possibly two inches deep, was made between the rows. Except that, there was no hilling done, and in this case no earth was thrown against the plants, and only a very little thrown towards them. June 25 poisoned the Colorado beetles with Paris green and water, using but a teaspoonful of the poison to one ten-quart pail full of water. July 5 to 12 poisoned them again. July 25 found a few more beetles and poisoned them. The above concludes the labor of growing the crop. We commenced digging the potatoes Sept. 9 and finished Sept. 16.

Cost of Crop.

Plowing the four acres	$7 30
Harrowing	4 00
Forty bushels Early Ohio potatoes	20 00
Cutting the same	6 50
Planting	10 00
Paid surveyor	1 00
Cultivating and hoeing	13 25
Opening drains after rain	2 00
Paris green	5 00
Putting on the same	9 87
Digging, picking up, heaping and covering up the potatoes	60 00
Total	$138 92

This includes the cost of the crop with the exception of the manures, and amounts to $34.73 per acre. Now let us add the cost of the fertilizers:

Cost of Fertilizers.

Plat No. 1, 20 loads of compost manure at $1.25 per load	$25 00

Cost of cultivation	34 73
Total cost of the acre	$59 73
Plat No. 2, 80 bushels of unbleached ashes.	$7 00
Cost of cultivation	34 73
Total	$41 73
Plat No. 3, fertilized with 1,500 pounds of Bowker potato fertilizer	$30 00
Cost of cultivation	34 73
Total	$64 73
Plat No. 4, received 1,500 pounds of the Mapes's potato fertilizer	$30 00
Cost of cultivation	34 73
Total	$64 73
Cost of the crop as they lay in covered heaps	$230 92

You will probably think this a pretty heavy expense to incur in growing potatoes, viz., an average of $57.73 per acre, but we will now see about the receipts:

Receipts of Crop.

Plat No. 1 yielded 384 bushels of merchantable potatoes, worth 35 cents per bushel, and 21 bushels small ones, worth 10 cents per bushel	$136 59
Total cost	59 73
Leaving a balance of	$76 86
Plat No. 2 yielded 434 bushels merchantable and 21 bushels small potatoes, total, 455 bushels (same price)	$154 00
Deduct cost	41 73
Balance	$112 27
Plat No. 3 yielded 432 bushels merchantable and 22 bushels small ones, total 454 bushels (same price)	$153 40
Deduct cost	64 73
Balance	$88 67
Plat No. 4 yielded 402 bushels merchantable potatoes and 20 small ones, total 422 bushels (same price)	$142 70
Deduct cost	64 73
Balance	$ 77 97
Balance on plat No. 3	88 67
Balance on plat No. 2	112 27
Balance on plat No. 1	76 86
Balance over all expenses	$355 77
Total yield, 1,736 bushels.	

I have for the sake of brevity thrown out the fractions of bushels, but the aggregate varies only ten pounds from the exact weight, as weighed out and sworn to by upright and disinterested men, who had charge of digging, picking up and weighing the entire crop. The price given is a little less than that actually received, and all are sold except 200 bushels that I had saved for seed. They were large and smooth, even in size, and in every way desirable for the market, and there was no trouble in getting a few cents per bushel more for them than the regular market price.

The Best Will Pay.

Now what are the lessons to be learned from the above statement? The average yield of potatoes in the Northwestern states does not exceed 100 bushels per acre, and in the Southern states is much less than that; but it will be readily seen that if I had received only 100 bushels per acre I should have run heavily in debt. Two hundred bushels per acre would have paid expenses, interest on land and taxes; though it would have left very little, if anything, for profit. But with over 400 bushels of beautiful merchantable potatoes per acre that would, and did bring more than the market price, the balance upon the right side is certainly a nice one. The season was hardly an ordinary one. It was very wet for a time, the latter part of May and early in June, and after that it was very dry. Some of the potatoes were seriously injured by the dry weather. Those that were fertilized with ashes stood the dry weather best, and as it has been seen, yielded a little the most of any, and gave by far the largest profit of any of the fertilizers used.

Save the Fertilizers.

At least, one of the lessons should be to save every bushel of ashes that can be made, and then buy all that are to be had at a reasonable price. Some of your readers may say: "Our land is not rich enough for such crops, and we cannot make it so without bankrupting ourselves." Now, fellow cultivators, please listen for a moment. Five years ago last spring I purchased a large part of the land upon which this crop of potatoes was grown. It was new land, and covered with stumps and brush.

Thorough Preparation.

We dug out both stumps and brush so completely that one good team of horses plowed the entire piece without once striking a root or stump that held them up. We planted the piece with potatoes. The season was a fair one, but we harvested less than 100 bushels of merchantable potatoes per acre. Five years later we harvested over 400 bushels per acre of much better ones. There are millions of acres of land in these Northwestern states that are capable of growing just as large crops as here reported. They will not do it next season, because the soil is not at present sufficiently fertilized, neither is it in first-rate condition, but, my friends, you can begin to put it in better condition next season, and keep on improving it year after year until it will yield as large crops as have been reported either here or elsewhere. In short, to me it is only a repetition of the old, old story.

Poor Crops Will Not Pay.

Moderate and indifferent crops do not pay and cannot be made to pay. They have not paid for a number of years past and I can see no prospect of their paying any better in years to come. Very large crops have paid in the past. They will pay yet. They promise to pay in the future. Then let us all, instead of constantly trying to increase our number of acres increase the yields per acre, and, by so doing, I firmly believe we shall make more money, have more comfortable homes and be of more service both to our neighbors and to our country.

DISCUSSION.

Supt. Morrison—How was it possible for you to receive that price for potatoes, when potato growers at Waupaca were receiving only 20 cents for potatoes?

Mr. Smith—I thought it possible that I might sell them for seed potatoes, and having a large acquaintance as I did all over the country, I wrote to a number of seed men throughout the United States, and among others to Peter Henderson; a gentleman who saw my letter to Peter Henderson and saw the offer I made to him, wrote to me as soon as he saw the letter and said to me, I will take a car load at the price you offered to Mr. Henderson, and I sent him a carload, and a carload to a commission firm in New York city; I told them the potatoes were perfect, that they couldn't find any potatoes but what were just what I represented them to be, perfectly sound, pure and good in every way, and they brought me considerably over 35 cents; they brought me seven cents above the market price simply because they were extra nice.

Supt. Morrison—The point I wish to make for the report is that it is one thing to raise a big crop and another thing to market it.

J. C. Martin—Do you regard that as a reliable market that you put those potatoes on, or is it a sort of special market? Is it on account of your reputation as a horticulturist or on account of merit in your goods that you can secure these good prices?

MR. SMITH — My reputation would amount to very little if I sent a poor article on the market. I study up the markets of the country and if there is a deficiency in any part of the country I find it out; I find out the rates of freight; I find out some good reliable dealers there in that line; if I don't know them I find out who they are; and whether they are in Kansas or in New York or New Orleans or somewhere else, and I don't know why farmers generally can't do the same thing.

J. C. MARTIN—You dodge the middle man?

MR. SMITH.—Yes, I get just as near to the consumer as I can.

WELDON VAN KIRK—How do you get the reliable dealer?

MR. SMITH—One way is to go to Bradstreet's, and if I don't know any other way I go to the reports and find out some man dealing in such or such a business, and write to them, but generally I know somebody, somewhere in that neighborhood that I can write to and say, "Hunt up some good reliable man and let me know about them," but if I don't know of any one there, I go to Bradstreet's.

C. R. BEACH—Do you use leached ashes or unleached.

MR. SMITH—Unleached.

QUESTION—The gentleman stated in his paper that a rain storm came prior to the time that he intended to cultivate the potatoes last, so that he could not cultivate them, on account of spreading the tops. I would like to ask if you think the cultivation, if you had got it performed before the storm, would have done those potatoes any harm, or would have done them good in the aggregate of the crop?

MR. SMITH—I can't answer that; I intended to have gone over them for the sake of stirring up the ground a little more and keeping it a little looser; I don't know whether it would have added to the crop or not.

QUESTION—I would like to ask the variety of the crop?

MR. SMITH—Early Ohio.

THOS. CONVEY—What importance do you attach to the use of good seed?

MR. SMITH—A great deal of importance.

JAMES JACKSON—Do you bank your potatoes?

MR. SMITH—No, sir; they were not hilled.

JAMES JACKSON—Do you believe in open cultivation, or would you have hilled those potatoes, provided the weather had been proper?

MR. SMITH—I would not have hilled them.

JAMES JACKSON—I have found that the pototoes I hilled were far superior to the ones I didn't hill. Of course I used none of the fertilizers; only the barn-yard manure.

MR. SMITH — How deep do you plant them?

JAMES JACKSON—I believe about three inches under the surface.

MR. SMITH — How deep was the land plowed?

JAMES JACKSON—Probably eight inches deep.

MR. SMITH—What kind of soil is it?

JAMES JACKSON—Clay sub-soil.

MR. SMITH — I find that the largest crop that I have ever known of was grown by flat cultivation. This was not quite flat; we put on the shovel the last time through them and made the furrow two or three inches deep, and threw the earth toward the potatoes, but no earth went to the tops, so it left the ground a little sloping toward the potatoes and a heavo rain would have run in toward them.

A. O. Hinman — How far apart were the rows?

Mr. Smith — They were thirty inches apart and the pieces about twelve inches apart in the row.

C. I. Brigham — Might not hilling be of advantage in a wet season?

Mr. Smith—I think it would in a dry season, particularly if not thoroughly drained; my land was thorougly drained.

James Jackson — Isn't hilling of advantage in a dry season; doesn't it help to hold the moisture in?

Mr. Smith—No, I don't think so.

James Jackson—Doesn't the constant cultivating of the soil in a dry season tend to hold the moisture more than letting the soil lie still?

Mr. Smith—Yes, it does a great deal more; you can almost get clear of any ordinary drouth by constant cultivation.

James Jackson—In those potatoes of ours, those that we didn't hoe, there were some weeds that came among them, more than in the potatoes hoed by hand; now was that the cultivation that made the extra crop, the extra hoeing, or was it the weeds that made the poor potatoes?

Mr. Smith—Very likely both; I don't believe in weeds?

H. P. Rundle—Are you troubled with potato bugs, and if so what is your remedy?

Mr. Smith—Yes, we are troubled with potato bugs; we go over them with Paris green and water; put in about half a tablespoonful of Paris green to a pailful of water and put it in a sprinkling pot and just sprinkle them over; we can destroy them very readily in that way.

H. Robbins — Would you use land plaster if you couldn't get the ashes?

Mr. Smith — I have not used plaster on my land for many years.

A. O. Fox—I would like to ask if you have ever found that Paris green sometimes injures the plants?

Mr. Smith—It will injure and destroy any plant if you make the water too strong of it; I made my first use of it a good many years ago, and I killed everything I put it on to; potatoes will bear it stronger than most any other plant that I have ever used it upon.

J. M. True—I am anxious to know, Mr. Smith, whether you think that wood ashes would be found equally beneficial upon all kinds of soil? For instance upon the black loam soil like the one described by Mr. Jackson?

Mr. Smith—I don't know about that; with me it is a remarkable fertilizer; we consider it better with potatoes than any compost heap manure, which we consider the best manure. Besides, nothing that I have ever used or seen used is equal to ashes as a protection in time of drouth.

J. M. True—And isn't it a fact that moisture is especially necessary?

Mr. Smith—Yes, sir.

C. P. Goodrich—I wish to get some information about the time to dig potatoes. Now, these early potatoes planted early will ripen early, the last of August or first of September, now if you want to keep those potatoes over, what time would you dig them, as soon as they ripen or leave them in the ground?

Mr. Smith—I would dig them as soon as they were thoroughly ripe.

C. P. Goodrich—How would you take care of them in the warm weather?

Mr. Smith—Put them in heaps of anywhere from 25 to 30 or 40 bushels on top of the ground, and cover them over with a little straw, and then a couple of inches of earth, just enough to keep the rain out, and leave an opening in the top to let the moist air out, or for ventilation, leave them there until the ground begins to freeze in the late fall, and then put them in the cellar, and in that manner I have never failed keep them nicely.

R. D. SEELEY—Do you reject the small potatoes in preparing for market?

MR. SMITH—Yes, sir; throw out the small potatoes.

R. D. SEELEY — Do you approve of planting small potatoes.

MR. SMITH—No, sir.

R. D. SEELEY—What disposition do you make of your small potatoes?

MR. SMITH—Boil them up and feed to the hogs mixed with other things.

R. D. SEELEY—Are you satisfied that the small potatoes don't produce as large potatoes when used as seed?

MR. SMITH—I think you wouldn't notice the effect in a year but the inevitable effect would be to ultimately ruin the crop.

JAMES JACKSON—In answer to Mr. True's question as to the ashes as a fertilizer on our soil I would state that I have been hauling ashes for a number of years on to this piece of land where we had these potatoes. We had about a fourth of an acre of potatoes and we raised probably about 80 or 90 bushels, which I considered quite a crop, from a fourth of an acre, and I attributed the success to the use of the ashes as a fertilizer largely, of course I used some stable manure besides. In regard to potato bugs I would state that we have a zinc white establishment at Mineral Point close to our place, and I got some of the zinc white to kill the potato beetle, and it killed them effectually, and I believe it was a very good fertilizer for the potato also.

J. S. JONES—What do you mean, Mr. Smith, by the ground being under-drained?

MR. SMITH— It was under-drained with tile.

J. D. JONES—I would like to know how you would apply commercial fertilizers to potatoes?

MR. SMITH—By putting them on the top of the ground after plowing and harrow them in; all fertilizers are put on in the same manner and harrowed in after plowing.

GEO. MCKERROW—I would like to ask Mr. Smith if he thinks it advisable to plant whole seed, and do you get better results from it?

MR. SMITH—The experiments at our state station and in New York have shown a slight increase after planting whole seed, but it is doubtful whether it is enough to justify us in planting whole seed in potatoes like the Early Ohio, or any of those where you can get large pieces having a single eye.

I have practiced for a number of years cutting potatoes in a certain way; if you take a potato and cut it into slices and hold it up to the light, if it is a good healthy potato you will see something apparently like roots running from the eye down toward the stem end. Now our scientific men tell us that they are the feeders of the sprout when it first starts. I have taken that for granted and have cut them toward the stem end. If the eyes are close together we cut two eyes on a piece, and toward the stem end there are often three or four eyes on a piece. That is the way we cut our potatoes and we have been uniformly successful. I don't think we have had a crop of potatoes in our home garden for a good many years, but what would have run, if allowed to ripen, and where they have been allowed to ripen we feel sure of three hundred bushels to the acre, and we should hardly be satisfied if they didn't go as high as that.

J. M. True—Is it advisable to put potatoes in a cellar where there is no light. during the latter part of August or the first of September.

Mr. Smith—I should prefer to pit them outside, from the fact that they are more exposed to the air in the cellar, and the quality of the potatoes might be affected in the cellar.

Mr. France—Is there any danger of getting too much ashes on the land?

Mr. Smith—It is possible to get too much ashes on, but I think there is not much danger of it. That reminds me of one of my neighbors who was in my garden when I was putting on ashes. He said, Smith, do you like ashes for a manure? I said, of course I do or I wouldn't spend so much time and money for them. He said, I put them on my garden two inches thick on top and nothing has ever grown there since. I told him there wouldn't probably anything grow there for some years to come.

Supt. Morrison—When you store your potatoes eventually in the cellar do you have them covered over or do you exclude the light?

Mr. Smith—My cellar is a very dark one; if it was a light one I should have the potatoes covered over.

G. C. Hendy—I would like to put an acre of potatoes in this spring in sod, yet unbroken; how shall I proceed with it with the hope of getting a good crop? It is timothy mostly, and possibly some blue grass.

Mr. Smith—I never succeeded in getting a first class crop of potatoes from timothy sod; it doesn't decay quickly enough; I have tried it two or three times but have never made it what I would call success.

G. C. Hendy—Can you hope for success in raising a crop of potatoes after corn?

Mr. Smith—Yes, sir; I do it frequently.

C. P. Goodrich—What do you think of the practice that some follow of leaving the potatoes in the ground and not digging them until they are afraid it will freeze up?

Mr. Smith—I think it is a poor practice.

R. D. Seeley—In your flat culture do you find any trouble with the sun burning the potatoes, which we sometimes have with us?

Mr. Smith—Our ground is as mellow as a bed of ashes for nine or ten inches deep, and very few potatoes stick out and get sun-burnt, occasionally one; on a heavy clay soil I don't know but I would hill them some.

W. H. Cole—After you have got a piece of ground in good condition for potatoes, what success do you have in raising them year after year on the same ground?

Mr. Smith—I don't raise them year after year upon the same ground; I change the ground but not the seed.

R. D. Seeley—I would like to ask the gentleman how he prepares the ground, and how he covers them, what implement he uses?

Mr. Smith—The ground is harrowed and made just as smooth as for a flower bed; we then have a marker that is made just like the old fashioned wooden hay-rake about twelve feet long, with something put on to draw it by, and the teeth reach back nine or ten inches; the head is full of holes and the pins are loose in the holes, and they can be put in and set for six to twelve inches or three feet or anything we like, and we put this thing on the ground and mark the rows thirty inches apart. Then in planting we give a man a hoe and a boy a basket of potatoes, and they go and commence at the end of the row; the man strikes his hoe in and draws back the dirt; the boy drops in a piece of potato; the man steps forward about twelve inches and draw back the dirt and throws it into the hole made before; so every stroke of the hoe makes a place for a potato and covers one, and in this way the planting can be done very fast. The four acres cost me $10 for marking it off, planting the seed, etc.

GEO. MCKERROW—What crop would you prefer to follow with potatoes for the best result?

MR. SMITH—Well, a crop of potatoes leaves the land in splendid condition for almost any crop; if I was growing wheat I should try wheat.

GEO. MCKERROW—What crop would you have precede your potato crop?

MR. SMITH—Well, we are not particular about that, we follow corn very frequently.

SUPT. MORRISON—How about clover sod?

MR. SMITH—I should not hesitate to put potatoes on to it.

C. P. GOODRICH—How do you dig your potatoes?

MR. SMITH—We dig them with a six-tined manure fork, just go in and throw them out; two men will throw them out as fast as three pickers can pick them up.

SUPT. MORRISON—We have held institutes in some of the counties this winter, such as Waupaca and Waushara and Chippewa counties, where they are raising a great many potatoes. Up in Waupaca county I found men who raise forty, fifty and sixty acres of potatoes. There they use machinery largely, for the planting and digging of potatoes. We found one man in Chippewa county who said it cost him just seven cents and a few mills a bushel to raise his potatoes. He had got the thing figured down so close that it cost him less than eight cents to raise a bushel of potatoes. He raised something like ten thousand bushels on forty acres, but off from his ten thousand bushels he didn't make as much as Mr. Smith did from his four acres of potatoes. He said he would give any man $200 to take the crop off from his hands and pay the bills. That is a notable illustration where a man went on haphazard and raised forty acres of potatoes and didn't know where he was going to put them. Those potatoes were picked up, large and small ones all together, and the first car that went to Chicago were unmarketable. The all-round farmer must produce a large crop, offer it in the best condition, and know where to send it.

MR. SMITH — That car of potatoes where I used the ashes cost me only about eight cents per bushel.

BREEDING AND FEEDING FOR BEEF.

By PETER WAKEM, Manager of W. H. Jacobs' Premium Herd of Short-horns, Madison, Wis.

Selection of Sires.

One of the most essential points in the breeding for a beef animal is in the selection of sires to be used in your herd. I sometimes think it is of more vital importance to the successful breeder and feeder than good feeding itself. It is impossible to feed a steer successfully or profitably if sired by a scrub sire. It is just as necessary to have good breeding in a steer to make him feed profitably as it is to have breeding in a thoroughbred horse to make him run in front or to stay the distance required of him to win his race, or in a trotter to make him trot to the front. It is an established fact that in all domesticated animals, the longer you can get them bred in a line tracing directly through animals that have been of more than average merit as producers of the special product which they have been bred for, the more pronounced they will be in producing offspring, having their good qualities if properly mated.

These being facts you must be very particular in your selection of a sire. Do not use a grade—not even if he is fifteen-sixteenths pure blood. While he may be a good individual, the fraction of scrub in him is very liable to show itself in his produce. Select pure bred sires of known lineage, known to have come down through families that were great beef producers. There are plenty of them to be found, *especially* amongst the beef breeds, either Shorthorns, Polled Angus or Herefords or perhaps some of the other breeds, who lay claim to be great beef producers, but do not appear to be very successful in proving it.

In Making Your Section

You should pay great attention to the handling of the animal. You must get the mellow, soft touch. Do not get too thin a hide as they are apt to be tender and not stand our winters well. Nor must you get too thick a hide, as I have never seen one that was a good feeder. Get a medium one, with a good coat of thick, mossy hair, that when you take hold of it it feels as soft as velvet. Get a sire with a good strong head on him, as they are sure to be the most impressive breeders, with a good heavy jaw showing the ability to crush an ear of corn. Get him with a good broad back, full over the crops and over the loins, as that is where the more valuable and high priced meats are. Thick through the heart, wide between the fore legs and standing square on them, showing plenty of constitution, short on his legs, as you never have seen a long legged animal of any kind or breed that would put his feed to good account; well let down in his flank, showing his ability to carry a good dinner. Get one well filled up in the neck veins, and well let down in the twist with a middling straight hind leg, so that if he is fed to a great weight, he will not be so apt to *break down* on his legs, with a good, mild disposition, and you have my word for it, that you will have a sire that will get good calves if properly mated, that will put on flesh rapidly and mature at an early age if properly fed and cared for. Never mind what color he is as it is not the color of an animal that tells you how much good meat you can put under his hide at the least possible expense. In purchasing do not purchase some over-fed brute that has not been given exercise or properly fed. Nor above everything else do not buy some half starved animal that perhaps has not had any more exercise than the well-fed one, and in all probability has eaten more feed, but through the ignorance and indifference of his owner or feeder, has never either been fed regularly or fed a properly balanced ration, and expect him to prove as good a sire as one that has been properly taken care of.

Care of Sire.

After you have secured and tried a sire feed him well; feed and water him regularly; give him plenty of exercise. Never forget that he is half your herd, as every calf you get should look more like the sire than the dam. Especially would this be the case if your females were grades. Having secured a sire that pleases you, keep the best lot of cows you can afford. If you start with scrub cows, get away from there just as fast as you can. Grade up, keep none but the best of your heifer calves for breeding purposes. Better feed a less number and better ones. There is very little excuse for any man who is making a business of breeding and feeding for beef alone, breeding any scrub cows. You can get pure bred cows, especially amongst the Shorthorns, with what is termed among some of the advanced breeders, as having unfashionable pedigrees and the Herefords so cheap that the wide-awake breeder and feeder of steers cannot afford to fool away his time feeding a steer that does not give a good account of the feed given him.

Time of Breeding.

Having selected a sire and cows the next important point to consider would be the time of year to commence breeding. Much would depend on your buildings and stable accommodation, and the number of cows you have. If only a few cows and your stabling is good, you cannot be far wrong in breeding any time of the year; but if you have a large number of cows and your stabling suited to your wants, I would breed to have calves dropped in the fall. We have at present something over one hundred cows. I like our calves to come in September, October or November and have them come as near the same age as possible, as the more even you get them as to age and size the better they will feed together and the better they will sell when you get to market with them. My reasons for having them come in the fall are, we can take better care of them in winter than in summer. You can secure good help cheaper. You have your cows tied up and if anything goes wrong with them you have them where you can take care of them. If I wished to be successful in raising and feeding prime young breef, good enough to top Chicago market when from 24 to 30 months old, I would let the calves suck and let them have a cow each. I would not attempt putting two calves on one cow unless in cases of an accident with the dam, or perhaps you might want her to supply your home with milk and butter. I would much prefer raising one good steer calf to raising two poor ones. I would let calves suck three times a day, dividing the twenty-four hours as to time as nearly equal as convenient. Castrate when two weeks old, and when a month old start and give them a little ground feed with some sliced roots, a good ration for calves is 2-3d crushed oats and 1-3d corn meal and wheat bran, with what roots and hay they will eat. You must be very careful in keeping a cow's udder well milked out. They must be inspected and milked out after each time the calf sucks, or at least twice each day. Because if your cow should happen to lie down and get a teat dirty, the calf will not take hold of it, unless washed clean. Keep calves away from cows except when sucking, and always have plenty of clean water where calves can get a plentiful supply, as they will drink a little quite often. Have your calves kept in a yard where they can get plenty of exercise in fine weather. Keep your stalls or basements well bedded with straw, well lighted, with plenty of ventilation and not too crowded, rather have them divided in small numbers.

Care of the Calf.

I am often asked why I let the calves suck and would it not be better to milk the cow and feed the calf, my answer is, no, it would not. A man can let out one hundred calves and let them suck easier and quicker than he can milk two cows, especially if one of them does not care much about being milked, and another reason is, you cannot raise as good a calf by feeding it the milk as you can by letting it take it in the natural way. Not so many chances of the calf taking too little or too much if it helps itself. And a better reason than either is I am feeding to get beef that will bring the top price of the market while the man who trys to raise calves on skimmed milk, and wind is feeding for the bottom price and the two prices are a considerable distance apart one not quite so profitable as the other.

Fall Calves.

Another point in favor of fall calves is, you have your calves weaned, and your cows dried off if you did not see fit to keep on milking them, when they could easily be kept apart and turned to grass. And you also have had your cows in the yards when you could attend to their breeding, and not have to chase all over the pasture after an excited cow, as is often the case when you want her. You would have your cow dry and in calf when turned out, and she would have a good opportunity to recuperate and be in good flesh before calving time, and all through the months when flies are so annoying. Your cows would have nothing to do but stand around under the shade of a tree, or in the water up to their knees, chew their cud and fight the flies, gaining strength to produce another lusty calf while you could set out on the porch and fan yourself in your easy chair, or go to town and talk politics if you could find nothing better to do on the farm. Wean your calves when about six months of age when you would find it quite necessary to give your cows considerable attention in getting them dry, much depends on whether you wish to develop their milking qualities to any great extent, we sometimes milk them until well along to having another calf.

Keep the Calf Growing.

Well, having weaned the calve you never should allow it to lose any of its calf fat, always keep your steer a growing. I believe it pays to feed a grain ration from the time your calf is a month old until he is shipped to market, whether on grass or not, I do not mean to keep them on full feed. But keep them growing fast, as all steers should be marketed when from twenty-four to thirty months of age and should weigh at twenty-four months in the vicinity of 1,500. I believe the most profitable time to finish your cattle for market is summer as they, if properly fed will put on flesh rapidly while on grass. And if you have been using the right kind of a sire, one that has the qualities necessary to insure you an early maturing steer, you will have them ripe enough to top the market when two years old. The time has gone past when the breeder and feeder with brains keeps his steers until they are three or four years old. The time was and not long ago either, when prizes were given for four and five year old steers at Chicago fat stock show. The board having control over that great show have given notice to all intending exhibitors that this will be the last year they will give any prizes for three-year-old steers, showing that they are not going to encourage the feeding of any cattle that do not mature early.

Better Prices in the Future.

The markets for selling cattle have been somewhat depressed for some years past, but it looks now as if we had reached the turning point, and that those who have been steadily breeding and importing their herds, using none but the best sires to be produced, feeding judiciously, would reap a reward that would be quite satisfactory to them, as much so, perhaps, as any other stock kept on the farm or any other line of farming. There has been an immense number of cattle exported in the last year, and the feeder of good steers has made money, and there would still be a better price paid for steers if we raised better ones. The English people are much more a beef-eating people than we are, and they will pay a good price for the best beef. While in England a few years ago I saw American and Canadian beef hanging in the markets, both in Liverpool, Bristol and London, along with beef bred and fed in England, marked from a penny to three pence per pound cheaper than the English beef. And it is still done in all the markets over there where our beef is handled. Now, this would not be so if we kept a better class of cattle and fed and matured them as we should. I have heard it claimed our cattle lost flesh going across the water. This is not so, as they put on flesh every day they are aboard ship if they encounter no storm or very rough weather. A few men have nearly controlled the export trade of the past. A friend of mine, who exports from 75 to 100 cars a month, went to Boston a few weeks ago to make a contract for space to ship cattle, and was informed by two different steamship companies that when the contract he had ran out, they could not ship any more cattle for him for six months, as all the available space on all their steamers was under contract for that length of time to two men from Chicago. Exporters have made large sums of money in the last year, but the time is not far off when that great trade will not be controlled by so few men.

English Capital.

There is too much English capital looking for an investment in this country to allow it. I always feel ashamed when at the stock yards at Chicago, and see the class of steers unloaded from railroads coming from Wisconsin. It always looks to me as if we were feeding for the bottom price instead of the top one. Now, to the farmer who is located especially quite a distance from town, I believe if he understands his business and uses his brains and gives it his attention, there is more money to be made in breeding and feeding cattle for beef than can be done by handling them for any other product. You can keep up the fertility of your farm and do it with less labor and with more real pleasure than by any other style of farming I know of.

DISCUSSION.

GEO. MCKERROW—I would like to ask if Mr. Wakem approves of grinding feed for steers.

MR. WAKEM—The profits of grinding it would depend upon whether you have got hogs following or not; if you have got hogs following I don't believe it pays to grind the feed, especially where you have to hire your help.

THOS. CONVEY—Does it pay to cut and feed shock corn to steers?

MR. WAKEM—We think it does.

THOS. CONVEY—Does it pay to shell it or husk it?

MR. WAKEM—A great deal would depend on the age of the steers; if a year old I think it would pay to husk it.

THOS. CONVEY—Does it pay to cut it up with a feed cutter?

MR. WAKEM—Three years ago we were feeding 20 to 30 cattle, and we had to hire all our help, and we cut all our corn for both our cows and for steer feeding. I came to the conclusion then that it didn't pay on account of the amount of help it took to run it through the feed cutter. We have not followed it since. One reason for not doing so is perhaps because feed has been cheap, hay has been so cheap with us.

THOS. CONVEY—Does it pay to feed bran and shorts with corn in fattening steers?

MR. WAKEM—I have very little confidence in feeding shorts. I have always fed a great deal of bran, perhaps more than anybody in the state. I think that bran is one of our most valuable feeds in regulating grain.

JAMES JACKSON—How are you going to make money in making beef on thirty cent corn, and selling the beef in Chicago for five cents a pound. How many pounds of corn will it take to make a pound of beef, or how many pounds of corn do you feed a good healthy steer every 24 hours?

MR. WAKEM—I don't know, the cheaper corn is the more profit there would be in feeding it to steers that sell for five cents; but there are very few of our Wisconsin steers that bring five cents a pound, more bring two and a half, because they are a class of steers bred from scrub sires, half starved until they are 18 months old, and then fed whole corn and turned off before they are half fat. As to how many pounds of beef you get from a certain quantity of corn, that comes under the subject matter of the paper following mine, and I do not wish to trespass upon that subject.

C. R. BEACH—What is the value of ensilage for beef production?

MR. WAKEM—I have had no experience with ensilage. Instead of feeding ensilage, we are feeding rutabagas to our young stock and cows, and with as much satisfaction as anything on the farm.

J. M. TRUE—As I understand your paper, you recognize the importance of the constant growth of the young animal. Now, what grain feed would you feed a calf while it is having milk from the dam at the same time?

MR. WAKEM—I give a ration of two-thirds oats and one-third corn meal and bran with roots, and what hay they would want. This is for young calves until about the time they are weaned. I think the best calves I ever raised were fed on shelled corn and oats and a little bran. I suppose that roots take the place in a great measure of ensilage.

C. P. GOODRICH—I understood you to say that it didn't pay to milk a Shorthorn cow; was I right?

MR. WAKEM—You understood something that I didn't say.

C. P. GOODRICH—I will ask you the question, if you do think it does?

MR. WAKEM—Some of them do. I have seen Short-horn cows that give more milk than any Jersey that ever stood on earth. Two years ago we had a three-year-old heifer, and she was considered a beef animal, and before she was three years old she weighed 1,900 lbs. and shortly after having her calf we milked from her twice a day twelve quarts besides what she gave to her calf. The cow was shortly after sold to go to South America.

C. P. GOODRICH—I have a statement of one that I had that gave sixty pounds of milk a day, a Shorthorn cow, and I never made a cent of profit out of it. Have you made a practice of turning off yearling beef, twelve to fourteen months old?

MR. WAKEM—No, not as a general practice. The time of turning off beef depends largely on whether you have raised your steer from calves, or whether you have bought them from parties who have not taken proper care of them, and perhaps have had no breeding that would insure you early maturity; in that case I do not believe it would pay to turn them off young.

C. P. GOODRICH—I want to tell you a little incident that I learned from a Short-horn breeder in Iowa, Mr. Wylie, of Castania. I saw him I think in 1884 and he told me what he did the year before. He turned off a carload of yearlings, probably fourteen or fifteen months old; he had crowded them, as is his practice, all their lives, made them grow as fast as he could. This was an experiment; he had never sold under two years before; he sent a carload and got $7.50 a hundred; they averaged ten hundred, and he got an average of $75 apiece for them. He said he made more money on those than he had on any others, and intended to practice fatting in that way in the future.

C. R. BEACH — What pasture grass do you prefer for summer grazing of steers?

MR. WAKEM — I would rather have blue grass than any other grass that I know of for fattening steers on.

G. C. HENDY—I rather infer from the paper that he allows the calves to go to the cows, or the cows to the calves and take their milk twice a day; now I would like to know what convenient arrangement he has for following out that plan?

MR. WAKEM—Until the calves are two or three weeks old they are kept with their mothers. After that the cows are tied in a large stable holding seventy or eighty stanchions, and the calves are kept in box stalls by themselves, a certain number in each stall. They are all turned out together, and after going once or twice they will soon find where their mothers are, and will go there themselves; their mothers are tied in the same place every day, and we have no trouble in getting them to go there. Sometimes there will be a calf or two that doesn't get enough milk from one cow and will steal around a little, but not often. As soon as they are done sucking they are allowed to run in a yard where they will have water, and kept there until they go into the stalls again.

MR. DENNIS — Do you think the cow will pay with the raising of the calf alone?

MR. WAKEM — If we didn't think it paid we wouldn't keep the cows; we would go out of the business.

J. H. WISE—I would like to know what he calls an unfashionable pedigree?

MR. WAKEM—I suppose that most everybody has heard that there is an unfashionable cross in Short-horn cattle. In 1817 a gentleman by the name of Sanders went to England and imported some cows and a bull or two. The people that he bought them from had not kept a proper record of them. They were registered by Mr. Allen at Buffalo in the herd books in this country, but as Short-horn cattle became more numerous those tracing back to this importation have been called by a certain class of people unfashionable. There was also one bull, Red Rose by Earnestie, that was used by Mr. Bedford that did not have a record in the old country, though he had one in this country. I know a man in Wisconsin, some of whose cattle come of cattle bred by Henry Clay, of Kentucky, and he said that his word was sufficient without a pedigree; that was the way with the English breeders, their word was all that was necessary, but people are paying a great deal more attention to pedigree now than formerly.

J. M. TRUE — These unfashionable lines are called Seventeens, are they not?

MR. WAKEM—Yes, and others are called the Earnestie cross; some of the best animals today trace to those animals.

R. D. SEELEY—Are they not good beef producers?

MR. WAKEM—They are some of the best producers known. They have perhaps been followed a little further for show cattle; some of the best cattle I have seen are straight Seventeens.

JAMES JACKSON—Are not the Seventeens generally good dairy cows?

MR. WAKEM—So much depends on the manner in which Short-horn cattle have been handled that while some are very good dairy animals, others are not so good; the development lies entirely with the man handling them.

R. D. SEELEY—Have you had any experience in feeding green corn in fattening cattle; the best results I have experienced I obtained while feeding green corn.

Mr. WAKEM—I have not had much experience in that.

R. D. SEELEY—This year my pasture became short and I didn't like to sell my cattle, as they were hardly fat enough, and I started cutting corn and feeding it, and I noticed they began to gain immediately, and on that feed I think I had the best results I ever had with fattening cattle in a dry time. They brought four cents on the market.

JAMES JACKSON—I would ask Mr. Seeley how long he fed these cattle green corn?

R. D. SEELEY—I fed them six weeks and they averaged when I sold them 1,500; they had been wintered the previous winter on hay without any grain ration at all, and were turned out into the pasture untill the drouth came on and the pasture became short, and I then started in and fed them for six weeks on this corn, and they did remarkably well; of course the last of the feeding I snapped the corn as the fodder was getting a little too ripe.

J. M. TRUE—The age of the steers, Mr. Seeley?

R. D. SEELEY—They were three years old last spring.

JAMES JACKSON—Was this four cents the market price or at home?

R. D. SEELEY—They brought four cents in Chicago and it was a good price at the time.

JAMES JACKSON—What month did you market them in?

R. D. SEELEY—They were marketed some time in October, I don't remember the exact date.

JAMES JACKSON—I finish my steers on grass; that is as far as I take them, and then I take them to market. My experience has been since I have quit feeding corn that I come out on deck a little every time; but when I fed corn I always get a little behind.

MR. WAKEM—I suppose the persons who bought your cattle took them to southern Illinois and fatted them on corn and brought them back and got a bigger price.

JAMES JACKSON — The gentleman is mistaken as to these cattle being shipped into southern Illinois and fatted they were shipped east for the eastern market and I got four cents a pound for them. They were not fed grain but were kept on the pasture. I work it so that I am never short of pasture. They weighed just twelve hundred pounds and were all three-year-old steers; they topped the market for grass fed cattle, and the man that bought them bought them for corn-fed cattle.

MR. WAKEM — It is very seldom you strike such a man there.

JAMES JACKSON—I would like to know if Mr. Seeley can give any definite proof that he got what his corn was worth a bushel by feeding it to those cattle?

R. D. SEELEY — I judged by my eye and I would just as soon trust it as a a scale. I could tell every day that they were gaining, could see that their hair was getting glossy and nice.

MR. JONES—I think weighing cattle is no criterion anyway; you might make them thirsty and then have them drink and make them gain ten pounds a day.

JAMES JACKSON — I would state in regard to making these cattle better, making them five cent cattle, that the day I was in Chicago with these cattle, in 1889, the first five cent cattle crossed the scales, and it was considered a boom in the market, and there was considerable talk among stockmen about these cattle. I struck the boy that sold them—they were Illinois cattle and of course I was interested in how he had made them, how he had bought them and what they had cost him. I asked this boy to give me the figures on those steers, and what his profit had been. "Profit!" he said, "Good land! if I had fed a thousand like I have fed them, it would have taken a national bank to have paid my debt." He was in Illinois and fed 25 cent corn; I am in Wisconsin and must feed 30 cent corn. The Illinois climate is a better climate for fattening stock than Wisconsin, and if he couldn't make a profit with as good a lot of animals as he had, I claim that I have no business trying to feed or select stock against him.

JOHN H. WISE—We made an experiment by weighing both steers and feed on a Fairbanks scales, which lasted from Jan. 12th to March 3d, or 50 days; during this period the 17 steers ate 20,638 pounds of grain, about one-third oats, and two-thirds shelled corn, this grain with a little hay made a gain of 2,210 pounds, figuring the grain at half a cent per pound it cost us a trifle less than 4¾ cents per pound of gain, or per pound of beef.

I figure that the droppings the hogs get will easily pay for the hay, and the manure for the work.

C. R. BEACH — How much did the steers weigh?

MR. WISE—About 1,350 when we commenced.

JAMES JACKSON—What was the corn worth a bushel that you fed those steers?

MR. WISE—Well, we bought a good deal of the corn for 28½ cents a bushel.

JAMES JACKSON—Did you have the

corn hauled to you or did you haul it yourself?

MR. WISE -We hauled it from the cars, a distance of about a mile or so.

JAMES JACKSON—How many pounds of corn do you say you fed each steer a day?

MR. WISE—I didn't say how much we fed a day, it is only a test in the total. The test lasted from January 12th to March 3d, or fifty days, and during this period the 17 steers ate 20,638 pounds of corn, which with the hay fed, gave a gain of 2,210 pounds.

JAMES JACKSON—What was the cost of the corn?

MR. WISE—I figured it at half a cent a pound.

JAMES JACKSON—What was the beef werth that you put on to those cattle?

MR. WISE—I got four cents a pound for them.

J. C. MARTIN—We have tried a little experiment at our place, though I never expected to repeat it in public. I have some young boys and in order to encourage them I made them the following offer. I had bought some cattle at a sale for two cents a pound, and I gave the boys two each on the condition that they should pay me one dollar a hundred for ground feed. They were to weigh the cattle once a week. The boys kept an accurate record in which they set down the temperature, the average gain per week, the amount of food they bought, using their own judgment as to the ration they fed. I cautioned them to feed carefully and to see that what they fed was eaten up clean. They fed the grain at that price, one dollar a hundred. I sold the cattle at three cents and a half a pound. The boys made a profit of nearly twenty-nine dollar after paying me the price of the cattle when bought and a dollar a hundred for the feed.

H. ROBBINS—Let me give you an account of an experiment of mine. I had three steers which I weighed on October 7th; one weighed 1,190 pounds; one weighed 1,290 pounds and one weighed 1,335 pounds. They were weighed again on November 12th, after feeding them for thirty-five days, and then weighed respectively 1,340 pounds, 1,390 pounds and 1,480 pounds, which gave an average gain of four pounds per day for every steer. My boy carried on a similar experiment at the same time and his steers made a gain of five pounds a day for thirty-six days, but it cost him a little more a pound to do it.

SUPT. MORRISON—I will call on Mr. True to summarize what has been said in reference to this topic.

J. M. TRUE—I feel that this is an important subject, and it would not be dealing justly with it if it was dismised in the present condition of this discussion. While for the past few years the production of beef in the state of Wisconsin has been up-hill business, I think that we begin to see light ahead at the present time and to recognize the fact that within the coming few years, if our beef cattle are well bred and well fed, we may expect as good results from this enterprise as from any other. But it does seem to me that there is danger in the manner in which this discussion has been carried on of losing sight of the vital principles than must maintain themselves as the under current in the production of good work. Wherever, in this state or elsewhere, beef is to be produced in the future at a profit, these cardinal principles must be observed. the steer must be well bred and he must be well fed from the time of his birth until he is put upon the market. The idea that any animal, horse, or cow or steer, is to kept upon a Wisconsin farm for a portion of its life, and allowed to stand still or to go backwards, is a thing of the past. If there is to be any profit made in the future in this business it is to be by keeping the animal growing continuously, and I hope we will not lose sight of this fact in connection with this industry, where, equally with any other, these facts are important.

SUPT. MORRISON—There is a gentleman in Clark county by the name of Burpee who buys up cattle all over the county and sends them to the Chicago market. He said that two years ago he took down two carloads for which he had paid one and a half and one and three quarters and as high as two cents a pound in Clark county. They were sold at the stock yards and he noticed that the gentleman that bought the steers was an old feeder, and he made out to get acquainted with him and learned that he was from southern Iowa. This gentleman took those steers out into Iowa. Mr. Burpee gave at the Neillsville Institute his conversation with the Iowa gentleman. He said: How long do you expect to feed these steers? He said he would feed them until about the latter part of May and he would then bring them back to Chicago. He had to buy his grain and he didn't own an acre of land; he had to buy everything that was fed and he would sell those steers at four and a half and five cents a pound. Now you can see where he was going to make his money; he was going to make about two and a half and in some cases three cents on not only the original weight, but he was going to put enough on to the steers to pay for feeding them. Mr. Burpee said that opened his eyes. He came home and commenced feeding and marketing his steers the same as the old Iowa feeder, and he was making a success in producing beef. Such suggestions as these thrown out in the institutes give us some idea of what we can do in the production of beef, in the way of making money in the business.

CAN BEEF BE PRODUCED IN WISCONSIN AT A PROFIT?

By H. C. THOM, Dairy and Food Commissioner.

One Could Say No.

And be seated with objections from few, if any, feeders, while the phiz of the dairyman would beam with complacency. Feeders can ill afford to let affairs, which so interest them go by default because there is no man brave enough (barring Senator Vest), to champion an industry to which civilization owes so much. An industry which touches every man who has reared a male calf or lugged a soup bone from market. An industry which extends throughout every state and territory and effects every man's household, unless it is sanctified throughout the whole year to Lent. Flesh always has a market. Some one is bound to furnish it to our millions. Feeders have sworn a mighty swear that they could not afford to continue the business. Many have given up in dispair. They are going to try the cow. They don't know how she is made, let alone how to milk her. Herdsmen of the west have quit their calling; some of them are robbing stage coaches. It may pay a little better but it takes more courage to hold up a driver than it does to tie up a steer. We are a little down in the mouth in this section. A catch calf that runs with its mother the first year and the next two with grass, straw and water don't kindle the Chicago stock yards with enthusiasm.

The Scrub Has Been Looking

For its place for many years. At last "'tis found, thank God"; 'tis at the bottom of the mrket report.

Those Breeders ana Feeders

Who think, begin to see how railroads affect their trade. The circle of competition has been enlarging very rapidiy for a number of years. Chicago, the center, with a circumference 200 miles away meant the only competition. Kansas City dressed beef is now laid down on our market before it gets quite cold. In talking with a conductor on the Burlington road some few weeks since he stated that the week before he ran from St. Paul to Chicago ahead of an express with a train load of cattle. It costs but little more to ship beef from Kansas City than it does from Madison. Do you wonder that the business does not pay if we make poorer cattle here than in Kansas? Our only protection in the past has been that but few were in the business and that it cost so much and took so long to bring cattle from distant points.

These safety guards have all been knocked down. There is one salvation for us and only one; that is skill. Skill in breeding; skill in feeding. Any leather head can have a calf or buy one. It's directly in his line of business. He can keep him alive if the weather is propitious or he carefully reads Sergeant Rhodes' reports to know which way the wind blows. A machinest commands better wages than the ditch digger and works no harder with his hands. There is not half the competition in brains that there is in brawn. Wood must be hewn but less money secures that result than it does to fashion the mind in the school room or souls from the pulpit.

Good Stock and Economical Feeding.

The trouble with the cattle business at present is not so much the low prices they bring as it is the kind of cattle that are thrown on the market. Good stock is bringing better than $5 per hundred to-day, while most cattle are changing hands at from $1.75 to $2.50. Beef can be made on Wisconsin farms at $4 per hundred at a fair profit. Lower prices than $3.25 are ruinous to most feeders. As near as I can estimate beef can be produced at about $3 per hundred. That this can be done can be figured as absolutely as that butter can be produced at 13½ cents per pound, or that calico can be manufactured for 3¼ cents per yard. Three conditions are essential in order that meat can be produced at this figure. First, good stock; second, economical feeding and handling; third, early maturity. In some respects cattle are like men. The lean and hungry ones, although great consumers, are rarely fat ones. Your attention is respectfully called to the president of this association. It makes some men tired to carry around what they eat; others of closer build and more quiet consciences are content with what they get and ruminate over the cud of the eternal fitness of things and grow fat. The racer is the result of long years of careful breeding. The bullock, although of greater bulk, represents just as much skill as the courser. There is a strong sentiment in many minds against inbreeding. In a broad sense the tide may set the right way, many of us undoubtedly need training to know just what to do. It might be well to say here, however, that the Short-horn breed was best developed and perfected in the hands of a man who brought this about by the severest practice of inbreeding. The animals grew under his careful eye in grace and beauty. Desirable points were strengthened and developed; weak ones were eliminated and destroyed.

An abiding faith that skill would win brought about the grandest results, made the name of the man immortal, and left a race of cattle that lovers of graceful lines and colors will fall down and worship, for verily they were golden calves whose mothers would sniff at the sacred cow. The feeding and handling can be best brought out in the discussion perhaps, because I can then call to my aid men of greater age and experience. My experience has given me radical ideas on these matters; they may not be progressive, surely they are honest.

Early Maturity.

The question of maturity next demands attention. Three and four year old cattle are unprofitable. Thirty months is an extreme age to turn off. The first 600 pounds is cheapest. I know of a five-year-old steer that was kept 365 days eating as many pounds of grain and hay as when four years old and gained never a pound. Feeding experiments at our Wisconsin station gives ample data to clinch the statement that the quicker the maturity the greater the profit. That feeders complain is not to be wondered at. The stock yards evidence criminal bungling. Matched clear flooring is worth more than cull lumber. A poor ax helve finds a customer only in a plug chopper who splits kindling wood for his wife at the back door and does that little under protest. Yet Mr. Jones, of Dane county, sends a steer to Chicago that makes the average Texan stare, and kick because he does not get top market. The steer is not to blame, O, no! "Jones made him and he pays the freight." Jones would not expect a big price for poor eggs but he does for poor meat. Experience is not quite so strong in the latter business. When he "goes broke" Jones will wake up.

Animal Husbandry--Fertility.

It is all folly to talk of going out of the stock business. It is the true foundation of rotation. Without stock, farms would rapidly deplete in fertility. Wisconsin farmers have had a bitter experience and won't be caught again. It takes as much time and costs as much money to restore a lost fertility as it does to clear and break the original homestead. I would suggest that the general market might be improved if more attention could be given by our foreign consulates to this great industry. With much regret I am constrained to say that few of them know or care how much could be done in this direction. Nothing but flimsy excuses stand in the way of heavy exportation. Many of the so-called rulings are in direct violation of existing treaties.

The thousands who are in the business of beef production, the millions of money invested, should demand recognition and a channel paved to good foreign markets. That herdsmen may not become discouraged, I beg to call attention to the fact that we are growing faster in our demands than we are in skill in breeding and feeding. It is but a few short years since steers were changing hands at $12 per head when two years old. Just such cattle as we think ought to bring $5 per hundred. What right have we to ask this? This right. That we wish to ride in a carriage. A wagon used to answer. Wheat, so we say, can't be raised for 75 cents a bushel. My father used to raise it for 25 cents and haul it to Milwaukee with a team and kept up a cheerful whistle and raised a lusty boy with a good appetite. Ah, yes, luxuries of those days are necessities now. We are fighting the battle of life against greater odds. Our wants are growing faster than means for supplying them and we kick the Big Four, the steer, the market, and scold our wife because things are awry.

The Eye of the Master Makes the Animal.

A good animal well matured and finished with a sleek coat, with a good distribution of muscle and fat will bring more money, more content and smooth more wrinkles and keep back more gray hairs than all the petulant fault finding that ever rose to heaven. "The eye of the master makes the animal." Keep the old saying in mind. Bind your fortune to the Short-horn. They have had a glorious past, they are steady in the present, and the future is full to repletion of bright promise. "'Tis a popular fallacy that because a thoroughbred costs a large sum that he will thrive and fatten on ragweed and water. Profit comes to no man by shirking responsibility and labor. Give the animal care, treat him kindly, and shelter him and feed him, then will he grow under the master's eyes and conform to the measure of an ideal. Out of all this labor and love will spring a result that will be a credit and an honor to all these years of line beeding, to the men who have fashioned the Short-horn, by a long term of study, to be a thing of beauty and profit forever.

FUTURE PROSPECTS AS TO THE PRICE OF BEEF.

By MR. GEORGE WHICHER.

The Beef Question.

It is said that beef cattle are higher by 80 cents per hundred than one year ago—and many predict $1 a hundred higher in the next 12 months. This would be something of a boom in the general market for cattle in two years, and as I sincerely believe the day of booms are past I fail to see it in exactly that light. Let us examine the question and see what conclusions we can deduce from the experience of the past. It is true we of the great central northwest, have been reduced to a minimum of prices below the cost of production, owing, I think, in a great measure, to over-production and free grass on the western ranges, I claim has been the main cause of this over-production and low prices. I, of course, ignore the cry of monopoly of Big Four, and only wish there were more of them to get away with the surplus—for surplus it is, view it in any light we please—too many cattle for the demand.

The Cause.

In the last ten or twelve years, as the extensive system of transcontinental railways opened up the mountains and southwestern ranges, even to the Pacific coast, the then existing high prices stimulated over-production on the ranges. Cattle companies were formed, which with free pasturage created an over-supply, and as we of the productive lands of the interior basin of the central northwestern states kept right on producing, and we know we have to keep up our lands to the requisite tilth of production—it has created an excess of beef cattle and a consequent low price. Eight years ago this winter I was in Texas and attended many cattle conventions as a newspaper correspondent. The cattle boom then was near the crest of the wave and many ranchmen were selling their cattle ranches, herds and brands, because, said they, these prices cannot continue, and yet the boom went on for two years thereafter, and some of these conservative cow men, as they call them in the southwest, re-invested in their well sold plants at a higher price to afterward lose all. I saw cattle in the Kansas City stock yards in April, 1882, selling from $6.85 per hundred to $7.25, that in Chicago to-day would not bring over from $4 to $4.75, but a little over one-half. I saw corn selling in eastern Nebraska—Cass and Lancaster counties, at 60 cents to feeders—that in the same localities to-day, won't bring over 17 or 18 to feeders of the same grade of cattle.

Sheep Husbandry Booming.

Sheep men at the stock conventions were hardly recognized, while today a carload of fat wethers or lambs are worth more than a car of cattle. Wool appears to be no criterion of the value of sheep, but it is the demand for. mutton. The lambs with the little wool on them that would hardly amount to twenty-five cents a head, are selling in Chicago markets today for $6.85 to $7 per hundred.

Really, if the sheep produced no wool at all, we would save very near the present price for mutton purposes. And right here is a point before we pass, I desire to call your attention to. That there is an independent demand for the various lines of meats, that a plenty or over-supply or cheapness of others cannot control. Some one might say if beef and mutton were both cheap, a mutton will never see six or seven cents again; cheap pork or beef will take its place. And we might say now: why do they pay $6 and $6.50 live weight for fat wethers, 7 cents for fat lambs live weight? Why don't they supply their place with those splendid 4 and 4½ cent paraded steers. Our answer is, there would be a demand for a certain amount of mutton if the price went up to 10 cents a pound live weight. And the same rule applies to beef or hog product. I mean, of course, for fresh or block meats. Cured product is always more even in price. Yet we could not think of making any of those high priced products a speciality, if we did we would get left. The men making money in booms of any product on the market that comes up suddenly, are those who invested when the price was way down, and when they touch fancy prices they clean up the last head of stuff on hand. The men who fish for clams at high water generally go out with the tide.

Don't Give Up.

Now, as to this cattle problem, should we of upper Mississippi and Missouri valley, say we can't raise cattle at this price, and go out of the business, it would be a virtual surrender of the business to the range and Texas producers, we can't afford to do it. Let us keep hammering away, it hurts, but it is a battle with the range and Texas producer.

We are in the condition of Æsop's fable of the fox in the brambles. It is true, said the fox, that the brambles hurt my poor tender hide, but then I'm wearing out the hounds who are seeking my life. Yes, keep on a while longer, my friends, it is tough, it is hard, but with our cheap beef we are bankrupting cattle trusts on the ranges and in the southwest. They went in on a big thing, free grass, cheap fence. Let us make our pastures big enough, said they, that a pound of barb wire will fence an acre. Four or five cents an acre for pasturage, why those prairie grangers can *never* compete with us. But their calculations didn't fill out. The dynasty of these cattle kings were short lived ones. They could ship a few loads occasionally to keep up appearances, but the day of judgment must come eventually.

As Dean Swift expresses it in the South Sea Bubble:

"So fishes rising from the waves
Can soar with moistened wings on high,
The moisture dried, they sink again,
And dip their fins again to fly."

Yes, we sympathize with you western fellows that wanted to inclose the whole earth with barb wire.

The Swan Brothers first began and they soon had plenty of company. Like we have seen pictures of herds of buffaloes driven to a precipice by Indians, the first goes under and the herd follow to snow him under; so, in conclusion, I will say I wan't to see no boom at present in cattle—I don't believe there will be—but just a sufficient stiffening of prices that we may wean the rank fellows out a little easier.

We particularly felicitate you on your cheap fencing and fine grass; but behold, we will mock at your calamities, we will bewail you when your fear cometh and keep right on raising cattle cheaper than you can; so don't be disappointed, but keep right on pegging and hammering away, we'll fetch them after awhile.

SHEEP SESSION.

CAN THE MERINO BE PROFITABLY MAINTAINED ON WISCONSIN FARMS?

By W. H. COLE, Waterloo, Wis.

In a state situated as Wisconsin is our present and future prosperity depends largely upon our animal industries. The average farmer living isolated from cities, or villages, who depends upon grain raising to the exclusion of animal husbandry, will sooner or later, come to grief. And in a state like this, with so great a variety of climate and soil, and with a people of such a diversity of tastes and surroundings, there is room for all, without danger of jostling or crowding each other. And the pell-mell rushing from one industry to another, that has characterized us as a people, simply because it is paying better at the present time, is unwise.

"Make up Your Mind and Then go Ahead."

Experience has taught us, that by the time we get established in our new undertaking, the one we have just left is paying better. And we have been to an expense (and often a large one) in changing. Besides a knowledge of a business is capital in stock, and the man who knows the wants of an animal and has the conveniences for supplying them, can often come out successful, through a term of low prices by cheapening production; while one unacquainted with the business will fail. So I would advise one who has a knowledge of the dairy business and conveniences for it, to push it with energy and perseverance. While he who has a good market near his home, and has conveniences for it, can make money raising early lambs from the mutton breeds, if he puts a proper amount of brains into his business.

Sheep—Fertility—Wealth.

But for one who wishes to keep sheep in large numbers, or the common farmer who wishes to keep a good flock of sheep to work his straw and roughage into a condition to keep up the fertility of his farm, I believe there has no animal paid better for the past twenty-five years than the Merino sheep. In speaking of their working down roughage, I do not wish to be understood as confining them exclusively to such feed. The flock-master that does not keep his flock in a good thrifty condition, does not reap the profit from them which he otherwise might.

And the one who breeds for heaviest fleece on the the smallest carcass is not up to the times. I have always made size a specialty; and for the last ten or fifteen years, I would accept for breeding purposes none but a large, broad-backed sheep, with a long staple of wool. Such sheep as these pay well, both in mutton and wool; and that such sheep when ripe, do not go begging in markets is attested by the fact that I have sold three carloads within the last ten years pronounced by Chicago salesmen as good as the best. I feed from one to three carloads each year. And on one occasion they sold fifty cents higher than anything else on the market that day. And this year, while in the central part of the state attending an institute, I got a telegram from our home buyer that he would give me five dollars a hundred for my sheep. So elated was I with the prospect of selling something these dull times without running after the buyer, I sent back word that he might have them.

The question as to whether Merino sheep can be profitably maintained on Wisconsin farms is answered by the fact that there are hundreds of farms scattered through this state devoted to grain raising that keep but little stock, that could raise more grain than they are now raising, and keep one hundred Merino sheep in good condition on each eighty acres.

Paths of Gold.

This is no idle speculation. I have given this problem practical tests nine years ago this spring. I bought an eighty-acre farm which had produced but few paying crops for a number of years previous. The first year that I worked it it did not pay expenses, as I was obliged to work it in the condition it then was. In the fall I ran a fence through the center, turned one-half into pasture, emptied my sheep stables on the other half and continued to crop it, and have had bountiful crops ever since. Four years ago this spring I bought a 160-acre farm that had but little stock kept on it from the time it was entered from the government until I got it. I treated it as I did the first one as nearly as possible and with like results. I know from experience and observation that when you put it into practice there are no animals better calculated to revive and sustain the fertility of a farm than a flock of well-kept sheep.

We hear people say: "That man is lucky; he always manages to have good crops, or he always has butter to sell when it is high, a fat flock of sheep to drive off when they bring a good price." All things being equal, the farmer is lucky that has a fertile farm, and is generous enough to keep a sufficient number of thrifty animals to retain its fertility. In other words, that farmer is lucky who is not continually trying to get something for nothing.

Care of the Flock.

One word as to the mode of caring for sheep. Do not turn your sheep into a pasture and keep them there until snow flies; but sow a couple of quarts of clover seed with each acre of your sowed grain, and in the fall when the feed gets a good start turn your sheep on that which you do not wish to mow. It helps to keep up the fertility of the soil, keeps in check most all kinds of noxious weeds and fits your sheep nicely for winter feed.

If you have a large flock, do not let your lambs run with their mothers until winter, but separate them when four or five months old, and turn them on good succulent pasture and if it is in connection with your corn field so they can run through and crop off the weed seeds, this will be all the better. But do not confine them to a corn field, and as feed gets scarce and dry, bring them into their winter quarters at night, and feed them; thus introducing them to to their winter feed by degrees. In a word, put the same time, care and thought into your business, that the lawyers, doctors and merchants have to put into theirs. You will not then have to say that any fool can be a farmer. But rather if a boy has not business capacity enough to make a farmer, he had better study one of the professions.

DISCUSSION.

H. ROBBINS—What is your preventive of dogs killing sheep?

MR. COLE—The first sheep I ever owned was killed by a dog and I never had one killed since. I bell my sheep with large heavy bells. The dogs don't like to make too much noise when in mischief and these bells enable us to hear the disturbance in time to get to the sheep and either drive off or kill the dog. Dogs have been among my sheep once or twice but generally got out before I got there.

SUPT. MORRISON—Can Merinos be kept in larger flocks than the mutton breeds?

MR. COLE—Yes, I guess there is no dispute on that point.

SUPT. MORRISON—Have you had any experience with crossing with any of the Downs?

MR. COLE—Some little experience. If I was going to cross I would continually cross in one direction. This undertaking to cross first with the fine wools and then with the coarse wools, trying to get all the virtues wrapped up in one hide can never be done either in man or beast.

J. M. TRUE—How large a flock do you think can be profitably kept in one enclosure during the summer?

MR. COLE—I believe the fewer you keep together the better. I don't know how many you could keep together if you had a sufficiently large pasture. But a few animals do better together than a great many together.

GEO. WHICHER—If you were feeding a flock of sheep what kind of feed would you use?

MR. COLE—If I was confined to one thing I would rather have clover than any other one thing. If I was confined to one kind of grain, I would rather have oats. But in my practice I feed a little straw and a little corn stalks, and a little hay, each thing at a stated time each day.

GEO. WHICHER—I was told by a gentleman that he had the best results when feeding cut up corn.

MR. COLE—I have fed that a great many times. Sheep like to run their noses into the husks and root out the corn. They will eat it better than when it is husked and thrown on the ground.

QUESTION—How about sheaf oats?

MR. COLE—I guess they are as good a feed as can be fed.

J. M. TRUE—Isn't there a great deal of waste in feeding sheaf oats?

MR. COLE—If you feed them all they will eat, they won't eat much of your straw.

GEO. WHICHER—Would you have them have access to water continually?

MR. COLE—At all times, if possible, though they will do well without water, if they have good succulent food. But there is no condition under which they will do as well without water as with it. They will live with snow, but it isn't as well as to have water where they can get right at it. I have water right in my sheep stables where they can run right to it.

WELDON VAN KIRK—How many pounds of wool ought a well-bred flock of Merinos to average?

MR. COLE—A good flock of Merinos ought to average eight pounds of good clean washed wool.

WELDON VAN KIRK—Do you advise washing?

Mr. Cole—I don't advise it, only that it pays. For the good of the sheep I would advise not to wash.

Geo. McKerrow—I would like to ask Mr. Cole if he has a flock of pure-bred American Merinos or high grades?

Mr. Cole—When you get up into the sixty-fourths and one hundred and twenty-eights we call them pretty high grades, and we have got them right there in the town, that have sheared from seven to nine pounds. As to mutton sheep, if you are going to keep a sheep until it is three or four years old, there isn't a mutton sheep in the world that will compare with the Merino, but if you are going to sell them when they are six or eight months old the Merino won't touch some of the other mutton breeds. Men in our vicinity have gone into raising the mutton breeds and, without exception, it has been a failure. They wanted to huddle them up and keep them on the same food as Merinos, and they gaunted up so that it would make a man homesick to look at them; and the better you fill the Merinos the better they will fill your pockets, I can guarantee that.

A. O. Fox—There is one feature that we have not touched upon yet, which is quite important. I would like to ask what Mr. Cole finds to be the average percentage of increase in his lamb flock for the Merinos.

Mr. Cole—There is a point where the mutton breeds are way ahead of the Merinos. If a man has got a hundred Merino ewes, and keeps them the way men generally keep them, and he gets 75 per cent lambs, he does well. I have had as high as 75 lambs and never lost one but that is a very uncommon thing. Another point I keep in view is to breed from ewes that don't raise twins. A Merino sheep will only bring up one lamb and do well by it. A coarse woo sheep will do fairly well by them if you feed them well.

Supt. Morrison—What is the comparative value of the mutton from the Merino or from the Downs?

Mr. Cole—In my opinion the Southdown is the best mutton sheep there is, because they marble their meat the best. The very poorest sheep that I ever butchered was a Cotswold, because they don't marble their meat. Short wool sheep are more apt to marble their meat than long wools. The Merino sheep, in my judgment, if well cared for, is equal to any other sheep except the Southdown.

Here is one point that has not been touched upon yet. Men that keep sheep are troubled with ticks. If you are troubled with ticks get some tobacco stems. There is a kind of poison connected with those stems that will kill the tick as quick as anything I ever tried. Set up a kettle and dip the lambs in the wash and in four hours you won't find a tick.

The man who keeps Merino sheep is in danger of trouble from foot-rot. They are more subject to that disease than any other stock I ever handled. I have cured it in my own flock and in in my brother's and in my neighbor's. I made a trough out of 2x6 stuff, twelve feet long, and fixed sides up to it so the sheep couldn't get out, and on one corner of this trough I ran a piece of gas-pipe which was connected with a tobacco pail outside, in which blue vitriol was poured as strong as it would dissolve. I poured it into the pail and it would come through the gas-pipe into the trough. I pared the sheep's feet off closely, and then ran them through this trough, with the blue vitriol in the bottom. You can have five or six in the trough at once; and if you are thorough in never letting them step upon ground afterwards that they were on before this process, and clean out your stables at this time, and if you watch your sheep closely afterward, you will find this desease can be cured. Keep some of this preparation in a bottle and if you see a lamb with foot-rot, out with the bottle and apply the preparation.

GEO. MCKERROW—Wouldn't it be better to repeat this same process, after ten days or two weeks?

MR. COLE—I had 200 that I ran through in this way, and only 7 came around for a second treatment.

JOHN MARCH—How long do you have to keep them off the ground they have traveled on when diseased?

MR. COLE—I ran them through about this time of year. They got this foot-rot in the winter time and then they went on to the pasture. My brother let his go back onto his pasture again in the spring, but had no bad results.

J. C. MARTIN—How do you induce lambs to eat grain at weaning time?

MR. COLE—If I don't want to turn into a corn field I put some of my old tame ewes with my lambs, and I have a trough and put a little grain in there. You don't want to put in a great deal, a handful is better than a quart, and keep increasing little by little and very soon they will get a notion of eating. I never turn them into the corn field exclusively.

C. P. GOODRICH—I want to find out something of the profits of sheep raising. Can you give a statement of how much you can make on a flock of sheep in a year?

MR. COLE—I have about 200 sheep. I sheared this last year 187 sheep. My income from those sheep was something over $700. I have got my sheep on hand now and I have got my increase on hand.

C. P. GOODRICH—What is that increase worth?

MR. COLE—My increase and shearing produced some $850.

QUESTION—What will it cost to keep these sheep?

MR. COLE—I estimate that I can keep about eight sheep where I can keep one cow. I think that the feed I feed one cow will keep eight sheep well—it will feed more sheep if you feed your cow well.

GEO. MCKERROW—You want to remember that you keep the cows in the back-yard. Is that hardly a fair comparison?

MR. COLE—I keep my sheep in the front-yard. I have one I keep for a lawn-mower.

C. P. GOODRICH—It used to cost me $40 a year to keep a cow. If your sheep cost you in the ratio you mention, they would cost five dollars a year or the 200 would cost you $1,000.

MR. COLE—There is a difference in keeping cows. I keep my cows for ten or twelve dollars apiece. There is an indirect profit from sheep, that is way ahead of anything from any other animal—it helps to keep up your farm. On an eighty-acre farm you can keep two or three hundred sheep and raise as much grain as by not keeping them. There is where you make your profit.

PROF. W. H. CHANDLER—I do not think I can add anything to this discussion. I have never been a very successful sheep man myself, and yet there is no branch of farming industry that has interested me more than sheep husbandry, and I have watched with a great deal of interest and no little attention the efforts of men who have devoted their intelligence and their persistent efforts to this branch of labor. I learned this in my observations: While I was laboring seven days in the week to just get a living raising wheat, my neighbor was doing the same thing in raising wheat and sheep and he had no more help than I had, and at the end of the year he had the profits of the increase of his flock, the profits of his shearing, and the profits through the year of an occasional addition to his table without a money expenditure. Now that I have observed all the way through, I do not see where the expense comes in very greatly in the keeping of a few sheep on the farm. It certainly does not come in the way of personal care. It does come in the way of using some of this land.

I have watched the operation of my son-in-law in this direction with much interest during the past few years. Now, this last year was not a very prosperous year among the farmers in our part of the state, the central part of the state, owing to the drouth. But that young man had a flock of 200 sheep on his farm of 240 acres. Some of his land is low and unfit for cultivation, and is not even tile drained, it has mere surface-draining. It is a very poor pasture for cows and but a very few cows could be kept in there, but his 300 sheep have occupied that 80 acres of land as a rule. He told me this year that the income from that flock of sheep was just about one thousand dollars; that is his wool and his sheep that he sold at a ready market at home for mutton, and his flock is just as good as it was a year ago. To my certain knowledge he has not paid out $50 to get this extra income of a thousand dollars. He has of course used that part of his farm for that purpose, but the tract of land wouldn't have kept near that number of neat cattle; that would have been impossible. This sheep industry has insured him and others like him a living. He is not at all a shining example of this. The neighbors, I suppose, could tell many better stories about that than I have about sheep. But I see his sheep have insured him an income right along, year after year, without very great variation, and so I conclude that there must be something in this sheep industry.

Supt. Morrison wishes me to narrate my early experience in sheep raising. When I first went upon a farm of wild land in Wisconsin in the fifties, I had to learn everything by hard knocks, and I am happy to say I learned a great deal. I had about 15 or 20 large bodied, coarse-wooled sheep. I had only about 40 acres fenced in, and the sheep ran out on the prairie, where they were a source of trouble to everybody except myself. I got sick of the complaints of my neighbors, and went to one of my neighbors who was apparently a shiftless sort of man. I said to him, My friend, I want to trade my sheep for your cow. It was a good looking cow. He said, I will give you that cow for your sheep. I said all right, and drove the cow home. This was in the spring early and in a few weeks my man had cleaned out the refuse in the cellar and the cow got out of the barn and ate the refuse and swelled up and died. My neighbor turned his sheep out on the prairie and time went on, he paying no attention to his sheep apparently, until in two or three years that man had a flock of 300 sheep worth a thousand dollars in cash. I thought he had the better of the bargain. This is one of the things I learned.

THE FLOWER OF THE FLOCK. From Breeders' Gazette, Chicago, Ill.

WHAT KIND OF SHEEP ARE BEST ADAPTED TO WISCONSIN?

By A. O. FOX, Oregon, Wis.

If it would be consistent with the title to my subject, I should like to have spent a good part of the fifteen minutes allotted me, in showing some of the many advantages which sheep husbandry has over other branches of stock raising.

Sheep as Conservers of Fertility.

The wonderful adaptability of sheep as recuperators of worn lands, spreading their rich top dressing, fine and evenly over the growing grass with no other labor than that of the flock while quietly grazing; and simultaneously adding to our visible supply of mutton and wool; the small expense of maintaining fences for sheep; light labor and expense of caring for large numbers; and the semi-annual interest received from the capital invested; these are points upon which I would like to dwell but to which I can only now allude.

The proposition which we are to discuss is what kind of sheep are best adapted to Wisconsin? To answer this it seems to me the questions for us to solve are: how can we market our feeds in the form of sheep products, in the shortest possible time, with a minimum of freights and other expenses; how shall we develop the wool and mutton bearing qualities to such an extent as will put on the back of each sheep, the greatest amount of the highest priced wool, that can be grown upon the carcass which will mature the earliest into deep heavy mutton, of the highest quality and flavor, and in the most compact form for economic shipment?

Mutton and Wool.

In other words we must have a combination sheep, through which we can afford to market our best foods in the form of mutton and wool.

How shall we go to work to produce this combination sheep is a question upon which many good sheep breeders will differ, each leaning towards the particular breed with which he has been most successful, influenced, perhaps, by local conditions.

But we must throw away all old notions which cannot be logically supported under present conditions. We must be alive to the forces with which we have to deal, · the changes that are affecting our markets, we must produce what the consumers want, and for which the best prices obtain in the open markets.

We must look for the animal which is the best adapted to meeting these wants on a minimum of investments, and having found such animal, we must stand by him, whether he be "our hobby" sort, our daddie's, or somebody's else.

Nowadays, the tremendous energy of our people, the wonderful development of trade, the great rapidity with which ideas are executed, all lead to one great focal point, quick maturity.

The four or five year old steers are gone forever, as also the twenty months store hog; that sheep must go too, which cannot be properly fitted into deep, rich, nicely marbled mutton, at eight to twenty months of age.

The common sheep stock of the northwest, from which we must select our breeding ewes are nearly all of Merino origin, some nearly pure and others graded more or less with the various larger breeds.

A Cross for Profit.

For crossing purposes upon these ewes, to start with, I am in favor of using blocky, deep-set, high-bred rams of some of the recognized Down breeds, notably the Shropshire, Oxford, Southdown and Hampshire, my preference being in the order named. By the Down cross, especially the Shrop cross, we at once add from 35 to 70 per cent. to our average increase in lambs over the average of the Merino flocks, there are few flocks of Merinos that will average 90 lambs to the 100 ewes.

I heard one of our leading Wisconsin sheep breeders state at our recent agricultural convention two weeks ago, that his ewes averaged last season 75 per cent. of lambs. This corroborates my own experience with the same breed during a period of several years before we began using the Down ram for crossing. After the first cross of the Shropshire the percentage will raise at once to 100, and the subsequent crosses, if judiciously made, will bring it up to 130 and frequently higher, to 150 per cent. with a corresponding increased ability on the part of the ewes to furnish plenty of milk for twins, and to grow them in every way equal to single lambs. This one item of the increased lamb product is very considerable and is in itself sufficient to make the profit of a flock.

Selecting the Ewes.

In selecting our ewes to start a flock, they ought to be of good depth and well sprung at the loins, with neck not too short, a thick-necked or chucky-chopped Merino ewe is no better breed than a sow with a short neck and deep, heavy jowl. A good brood ewe should be of proper proportions, plenty of length and depth, and good breadth over the loins, not leggy, and yet not chucky, small thin ear, strong head, and a nice clean feminine countenance; she should carry a nice, clean coat of close, even lustrous, fibre.

What Kind of a Ram?.

The ram should be the embodiment of compact substance, and strong masculinity, a head so strong and masculine as to be almost coarse, with a large, full determined eye. He should be near the ground, heavy in heart, broad and close coupled in the back and loins and must be particularly well carried out in the hip and flanks with a good, straight hind leg. His body, head, belly and legs should be well covered with a good close coat of even texture, but not too fine in fibre for a ram.

With this sort of a ram and the ewes as above described, under good management we are in a fair way to breed first class mutton sheep, which at the same time producing a coat of medium wool, second to none, valuable at once for the splendid protection which it furnishes the sheep, its high combing merits and light shrinkage in the hands of the manufacturers, its freedom from noils in the weaving, and the popularity and durability of the manufactured goods.

But to decide this question of wool, let us investigate what kind of wool had we better grow, for what sort is there the strongest demand, where does it come from, and how many will be able to supply it?

An Object Lesson.

In order to present to you the facts on this wool question in an acceptable light and to avoid dry statistics, and political color, I have prepared this little case of wool samples from which we may easily see the relative value of each kind, their prices in the market, and the manner in which each kind may be grown by the farmer.

In order to obtain an accurate basis upon which to place my classification, I wrote to Mr. J. C. Hill, wool merchant of 192 Kenzie St., Chicago, requesting him to send me a sample of each kind of wool as classified on the Chicago market, attaching to such sample its classified name according to the grade of wool to which it belonged, and its then Chicago market price.

These wool samples, their names and their Chicago value are all placed in the right hand column. In the left hand column opposite each of these Chicago samples I have placed other names of like quality, selected by myself. Under each sample of this lot I have printed a history of how the sheep was bred that grew it. Under this again are samples of the manufactured goods, showing the kind of products that each kind of wool enters most largely into.

This wool is all unwashed and the prices are for the unwashed article. Now we will examine these Chicago samples, this first sample is classified as carpet and braid wool, the price sixteen cents to twenty cents.

It is undoubtedly a fair sample of Cotswold as you will see by the corresponding sample. The next sample is called "Quarter block combing," price 24c. to 26c., this goes to make cashmeres and tweeds. The sample to match this is a Shropshire-Cotswold-cross breed, the sample is of seven months' growth. It was grown by one of my patrons in Iowa and sent to me with a history of the sheep from which he clipped it. The next sample is termed "three-eighths-blood medium," price 27c. to 50c., it is a little finer in texture than the "quarter-blood-combing-wool.

It might be found in a flock bred the the same way as the preceding or by Shropshire-Leicester cross which produce an elegant staple like this sample. Here is a nice illustration of what selection may do in a flock.

Here is a sample of pure Shropshire of eight months' growth, which almost exactly matches the Chicago sample of ⅜-blood medium. It is four inches long, fine in fibre, bright and lustrous. The next is "half-blood Delane," price 27c. to 30c., that is a still finer fibre than the ⅜-blood medium. There is a little more Merino to this without the gum. While very fine and silky its shrinkage is considerably less. The corresponding Shropshire-Merino cross of seven months' growth; it is three and one-half inches long, very fine in fibre, lustrous and oily, and has not the heavy yolk of the pure Merino. This is a very profitable kind of wool to raise. The next sample is a "Fine Merino," price 20c. to 25c., and I do not consider it a fair sample of Merino wool. It is as far as fibre is concerned, but it is hardly long enough to be classed as a good sample. It has the characteristic heavy gum of the Merino.

It is readily seen here that there is a great difference in the market value of these various grades of wool in favor of the fine, close, lustrous medium staples three to four inches in length, the difference amounts to between five and fourteen cents per pound in favor of the medium wool.

Now in regard to the amount of our supply of this high priced medium wool, I find by the reference to the statistics of Lynch, of New York, and Bond, of Boston, that we are producing about thirty millions pounds of the medium wool annually and that we are importing annually under the head of this medium wool over thirty million pounds of this same class.

Then under the heads of cheaper grades of wool, quite a good deal of this medium wool is imported to escape heavy duty.

We are not Keeping Sheep Enough.

Under these circumstances, with such a premium paid upon the wool, we are not producing half that our mills demand, and this in the face of a much greater demand for the kind of clothing that medium wool makes.

Now friends, why don't we here in Wisconsin put in the necessary medium wool sheep and grow that other thirty odd million pounds of medium wool, instead of obliging our manufacturers to import it at over forty per cent. duty?

Where on earth are there finer hillside sheep walks, all over this beautiful state? Where finer water privileges, where better facilities for feeding and marketing?

Yet look at our state statistics: Wisconsin owns but a paltry 700,000 sheep, while low and sandy Indiana bobs up with a million and a half, Michigan two and one-half millions, and Ohio over four million sheep. Also note the prices that these last two states get for their best medium wool.

Where does Wisconsin wool stand as a class in the open market? It is a fact that the choicest of mutton and the highest priced wool can be produced on one and the same sheep. We can utilize our feeds to the very best advantage, growing two of the highest-priced products. We have it within ourselves, here in Wisconsin, to supply the greatest amount of all the fancy mutton required by our tributary cities—Chicago, Milwaukee, St. Paul and Minneapolis—and on the backs of these very same sheep to grow the other thirty million pounds of medium wool that will command almost any reasonable price we might ask, just as soon as we can learn to grow it intelligently, to do it up honestly after shearing, and to place it upon the market in an attractive form and a business-like manner, all plainly labeled, Warranted *Double X* Wisconsin Medium.

DISCUSSION.

H. ROBBINS—What would you cross with the Leicester full-blood to make the best mutton and wool sheep?

MR. FOX—I think with any of the recognized Down breeds; any animal which was selected from among the recognized Down breeds would give you good results. I know that to be a fact. As to my own individual preference, I prefer the Shropshire, for this reason, he is neither the smallest nor the largest; he is medium in size, and is wonderfully hardy, as has been shown by their being kept in thousands in England, where sheep are subject to tuberculosis. I believe that in making any cross the sire should be of a compact, strong constitution.

H. ROBBINS—How would the Cotswold do?

MR. FOX—I can answer that question no better than to quote the report made by the commission appointed by the Chamber of Agriculture, of Great Britain, some five years ago to investigate as to the various breeds of sheep. That commission reported, after having traveled over various districts, examining sheep and testing a great many on the block. Their report to sum it up in short metre, was, the best mutton sheep they declared to be the Southdown, the next best the Oxfordshire, then the Hampshire, the Border Leicester next, Lincoln next, and, last of all, the Cotswold. Now, that is the best answer I can give for that.

SUPT. MORRISON—In the southeastern portion of the state we have a great many of the Spanish Merino grades; what cross would you recommend upon those flocks?

MR. FOX—I would recommend the use of Shropshire or Oxfordshire rams on those ewes.

H. ROBBINS—I crossed first the Southdown and then the Lincoln with the Leicester. I crossed witn the Southdown and then with the Lincoln on to that.

GEO. MCKERROW—Did that make pretty good hash?

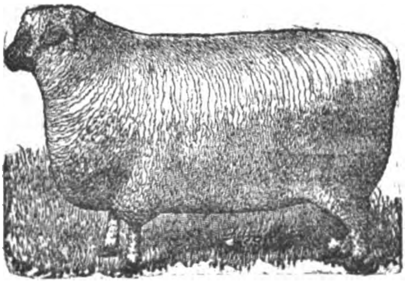
H. ROBBINS—Their wool averaged six or seven pounds and they were splendid mutton.

W. H. COLE—Would you advise crossing for mutton or would you breed right along in one direction?

MR. FOX—I think that in order to get anywhere we have got to have an objective point before we start, and therefore if I was to cross in breeding for improvement, I would like to lay out a line of action and stick right to it. In this subject we have under discussion, that of grading up the common stock, I should prefer taking any of the Down breeds and stick right to that breed, until you have got just what you want. This running all over for sires from one breed to another makes hash, and it is worse than boarding-house hash.

MR. MCCLOUD—What would. Shropshire sheep average apiece?

MR. FOX—I have had a flock of Shropshires for the last fifteen years, and they never averaged less than seven pounds unwashed. That includes the yearling sheep, that is lambs carried over, as well as the brood ewes. In order to produce a heavy growth of wool it requires heavy feeding. That the Shropshire is a good wool grower is amply shown by the evenness with which he grows his wool.



BEST METHODS OF BREEDING, FEEDING AND MARKETING MUTTON SHEEP.

By GEORGE McKERROW, Sussex, Wis.

This subject has been pretty well traveled over. You will pardon me if I re-travel some of the ground. First, let us take up the subject of breeding mutton sheep. I will say, first, that the breeder of mutton sheep should breed for the best and should be satisfied with nothing short of getting the best. By this I mean to breed for a class of animals that have in them the traits of early development, quick growth, the best quality of mutton, so that they can turn the food consumed to the best advantage, thereby giving us the largest profits.

The Mutton Sheep.

Now, I agree with my friend Fox, that in the Down breeds, as they are called, we have the breeds that we must look to at present time, for the production of this high class product, an early maturing sheep. He has mentioned the different breeds I would, having experimented with them all, for early lamb production, choose one of the larger breeds, the Oxford or Hampshire. It is claimed for the Hampshires that the mothers are the best milkers and will produce the heaviest weight lambs at an early age. But that breed lacks the form that we like to see in a good mutton sheep. They are the most rangy of any of the Down breeds, standing higher, not being as well formed or as well developed in those places where we find the high priced meat, the loins, chops and rounds. They are coarser, have coarser bones and have longer necks than the Oxford, and I therefore have a preference myself for the Oxford for early lamb production. If further back from the market, necessitating the putting of lambs on the market at from eight to tem months or from six to twelve months, I might say that then there would be little choice between the three breeds, Oxford, Shropshire or Southdown.

An Experiment.

Last year I weighed the meat from the three breeds; the Oxford lambs gave an average of 118 pounds each; they were born in March and weighed in August; the Shropshire lambs averaged 100½ pounds each, and the Southdown lambs averaged 101 and 1-3 pounds each. This shows you that the Oxford makes the most rapid growth, which is the reason why I should choose that breed as an early lamb producer. This matter of early maturity in these Down sheep is somewhat questioned by the breeders of other classes of sheep. The reasons that I have for naming the Down as the producer of the best quality of mutton are that in looking over the dressed carcasses at the fat stock shows in Chicago for the last three or four years, I have noticed that the Down carcasses were covered on the outside with lean meat, and when the meat was cut through they showed the marbled meat that is so highly prized by mutton eaters of this and all other countries; while other breeds, particularly the long wool breeds, bunch the fat upon the carcass;

upon some of their carcasses you will find large bunches of fat upon the rump as large as your fist and larger, without any outside covering of lean meat. We find in the Chicago markets right in the yards that the carefully bred Downs bring the best prices.

The Downs Topped the Market.

A carload of Oxford and Shropshire lambs shipped from our county in the month of December topped the Chicago market the day they were there at $6 a hundred. Those lambs averaged 97 pounds each and netted the shipper $5.73 per head. On the 19th day of March last I noticed a sale in the Drover's Journal of 194 grade Shropshire lambs, average 106 pounds each, which were sold at $6.85 a hundred, which topped the market for that week.

Gilt-Edged Mutton.

Now, if we are going into the mutton business it will be almost impossible for the average farmer to buy a good-sized flock of pure-breds of these different breeds, as they are selling at large prices. But by the selection of a good flock of large, roomy, grade ewes, from two to five years old, and the selection of a pure-bred sire of any of the breeds that we have mentioned, the farmer can start in and produce gilt-edged mutton. The thing he must do is to hang up before him the motto of early development. It takes young pork to bring the fancy price and the lamb to top the sheep market. The earlier that you can put the lamb upon the market the greater are the profits compared with the food that he has consumed.

Care of the Flock.

The sheep requires but little care, but that must be given at the right time or you will find loss resulting from the lack of it. We should begin to feed the flock well in the fall, keeping up an even growth and development; the moment that we allow a flock to run back in condition, the wool stops growing, they begin to lose mutton, the digestive organs begin to get out of condition, and though we may feed the flock highly after that through the winter, they will not recover from the bad effect of starvation in the fall. In the spring of the year we are apt to make a mistake in turning them out upon the grass again, and again we lose in mutton and wool and in the lamb crop, and in the growth and development of the lambs afterwards. When this flock is shorn and the secondary product of sheep breeding is offered to the buyer and he draws out staples from the different fleeces and stretches them between his thumb and finger, they will part, showing where the sheep was starved and the wool stopped growing, and we must take from two to four cents a pound less for the wool than the neighbor who has fed his flock well and evenly through the year. The manufacturer is not to blame; he cannot make good goods out of rotten wool; the feeder is to blame.

A breeding flock should never be made very fat, but should be kept plump and round. Many Merino breeders when they have begun to make mutton sheep have made a mistake in this direction. When a Merino sheep is in good condition it doesn't show it like a mutton sheep does. It doesn't naturally have that rotundity of form, and the man who has bred Merinos is satisfied if his mutton flock looks as well or a little better than his Merinos did, not taking into consideration the fact that they are rounder and should show better than the Merinos. Men who have tried Merinos are very apt to feed too light and to be satisfied with too low a condition of the flock.

Special Care of the Lambs.

When the lambs are born special care should be taken to force them along in their growth. As I said before, the mothers should be well fed, fed upon succulent foods, milk producing foods, so that they will be ready to give the young lamb a good supply of nourishment. Then when the young lamb is old enough to take extra food a part of the pen should be partitioned off with a sliding gate; we make ours of six inch fence boards, running up and down eight inches apart. We let this down and keep it clean and the small lambs will soon learn to go in there. Then I put in a trough standing up about six inches above the ground, with a rail to prevent the lambs from getting into the trough. Into this trough I put some grain—I prefer ground oats, and the lambs will soon learn to eat and will do uncommonly well. They don't eat a great deal but what they do eat they turn into a good price for your grain, continue this feeding, feed the mothers and the lambs very well, until there is a good bed of grass, and then they may go to grass, and then if you have got a mixed pasture on high land, by which I mean access to clover, timothy and wild grasses, blue grass, white clover, etc., and plenty of water, your flock will get along very well, but if there is a shortage of pasture, continue the grain feeding of the lambs. In this way you can force along a lot of well-bred lambs so that at five months old they will average from 80 to 100 pounds each, and will bring you in the Chicago market at least $6 per hundred.

The question of foods is often brought up. In fattening sheep that are matured, corn comes in as one of the cheapest and best rations, but if we are going to make a gilt-edged article of first-class mutton then we must use in this connection, succulent foods and more nitrogenous foods.

Cornell University Experiment.

I will quote in this connection an experiment made at Cornell University in the state of New York, during the winter of 1878–9. A few common lambs were bought at the station in the month of November, and they were very common lambs, only weighing from 36 to 50 pounds each. They were shorn in November and put into the trial experiment on the 25th day of that month. One lot was fed a nitrogenous ration, composed of clover hay and bran and cotton seed meal, with a few roots to keep them healthy. The other lot were fed a carbonaceous or fat-forming ration, composed of timothy hay and corn, with a few roots. Six months later the results of the experiment were summed up. The lambs fed on the nitrogenous food had produced mutton at a cost of $6.03 per hundred, while those fed upon the carbonaceous food had produced mutton at a cost of $7.59, showing a balance in favor of the nitrogenous foods of $1.56. Remember that these were young and growing lambs and needed more of the muscle and bone-forming elements than older sheep would have needed.

Then in regard to the advance of succulent foods another experiment was carried on at the same place and same time. One lot of lambs were fed upon hay and grain, having as much as they would eat up clean, and a ration of roots; while another lot was fed upon the same kind of hay and grain, having as much as they would eat up clean, but without the roots. It was found in summing up at the close of the experiment that those lambs that were fed roots had eaten twenty cents worth of roots; they had also consumed fifteen cents worth more of hay and grain than the other lot, but the lambs that were fed the roots had produced $1.17 worth of mutton more, than the lot not fed roots. In other words, an outlay of thirty-five cents brought back $1.17. It is a recognized fact that we cannot produce gilt-edged mutton without the use of these succulent foods. The Englishman appreciates that fact, and they understand it over in Canada full well, where there are some of the best sheep feeders in this country. There are men in Canada who make a practice of raising gilt-edged mutton and sending it across the line, paying the twenty per cent. duty, and still selling it in our large cities at a large profit. Now, if farmers up here in Wisconsin, in the same latitude as Canada, where we can grow the same classes of food that they grow there would turn our attention to producing gilt-edged mutton and put it upon the market, we could have some of that money now going across the line into Canada brought here into Wisconsin.

The question is sometimes raised as to whether we would not glut the market if we all went to producing first-class mutton. I have no fear of us all going into it, but to show you there is no fear of glutting the market with this kind of meat I will state that in the fall of 1888 I stayed four or five hours with the buyer of a Boston dressed meat house, who was buying up the surplus at the Chicago stock show; I asked him this question: How many of those sheep such as you have got here could you buy in a week? He said, I would buy 4,000 of them at the same price, if I could get them. The price was $7 a hundred. He says, we can't get near the amount we would like to get. He said there was no fear of over-stocking the market with this kind of mutton.

Some Drawbacks.

But it is not all plain sailing in the sheep business any more than in any other business. There are the parasites such as the liver worms and lung worms to be contended with. A very good recipe for dealing with ticks is the one given by Mr. Cole, that is, dipping in tobacco water. As to parasites I have found that by keeping salt, with a fourth to a tenth of sulphur in it, in troughs where the sheep can get at it, that I have no trouble with parasites. This may be due to keeping the flock in good condition, but I have noticed that sometimes in wet seasons while my neighbors are having trouble with their sheep I haven't had any. Sometimes in the fall of the year, after weaning the lambs, when we have a wet fall with a good deal of soft grass I find that the lamb flock will begin to scour, and the best remedy I have found for that is common white flour mixed with the grain ration.

The largest profits are made from putting young sheep on the market. You get from a dollar to two dollars a hundred more than for aged sheep, and you can make mutton cheaper on the young sheep than you can on the old ones.

DISCUSSION.

J. M. SMITH—At what price would gilt-edged beef have to be sold to secure equal profits with gilt-edged mutton or lamb?

MR. MCKERROW—I claim that I can produce a hundred-pound lamb, not taking the wool into consideration at all, but simply the meat, as cheaply as I can produce beef on the fifteen-hundred pound steer.

SUPT. MORRISON—What is the best ration for breeding ewes?

MR. MCKERROW—The best ration for breeding ewes with me I think is clover hay twice a day, straw, as much as they want to pick over in the yard the third time and a ration composed of equal parts of bran, oats and corn. If I am short of clover hay and have to reduce the amount of clover hay fed and feed some timothy or corn fodder, then I take out the corn almost or entirely; and I give a ration of roots.

J. D. JONES—I would like to know if the Oxford Downs are considered the best mutton.

MR. MCKERROW—That question is a hard one to answer; so far as the mutton quality is concerned the Southdown I guess is recognized as the best, but its size is somewhat against it in popular favor. Then the Shropshire comes between the Southdown and Oxford, the Oxford being somewhat larger, and its friends think that it is a better producer of the early lamb, as I stated in the beginning.

H. ROBBINS—It is very easy to get rid of mutton lambs, but how do you get rid of old sheep?

MR. MCKERROW—The ewes we wish to cull out of our flock we find no difficulty in getting rid of; we cull them out, sometimes fatten on the grass, sometimes late in the fall and sometimes later in the winter, and we have no trouble in getting from $4.50 to $6.

SUPT. MORRISON—To what age do you find it profitable to keep the ewes?

MR. MCKERROW—The mutton breeding ewe has her most profitable time between 2 and 5 years old.

WELDON VAN KIRK—At how early an age do you have the ewes drop their first lamb?

MR. MCKERROW—At two years.

THOS. CONVEY—Is there much mischief done by exposing sheep to cold rains and damp quarters?

MR. MCKERDOW—I believe I have lost as much in my flock by a cold rain before I knew enough to house them, as I have gained by a month's feeding afterward.

SUPT. MORRISON—Have you any system of registration?

MR. MCKERROW—Yes, we place a private ear-tag in the ear of the lamb. I have a regular record with pages and columns. In the first column is placed the name of the sire and dam, with their ear-tag numbers and the record numbers of their record in the acknowledged record of the Shropshire association's record, the Oxford record, the Southdown record, where most of my sheep are recorded. Then when an animal is born he is given an ear-tag, and his ear-tag number is placed in the proper column, or if twins two numbers are placed there; then when placed in the breeding flock they are placed on the proper page, and so on.

W. H. COLE—How old are the lambs when you put the tags in?

MR. MCKERROW—We have to put them in when the lambs are about two weeks old, and it requires special care then to sort them out and see that the ewes have their own lambs.

W. H. COLE—Do you have any trouble with the ear-tag working down into the ear of the sheep?

MR. MCKERROW—I do not; I have had them torn out.

THOS. CONVEY—Will a sheep eat when it is dark?

MR. MCKERROW—Well, I believe it is a pretty poor time for them to eat. They should not be fed earlier in the morning than sunrise and they should be fed in the afternoon so as to have them through eating by shortly after sundown or about sundown.

QUESTION—Don't you think they feed considerable in the pasture before sunrise in the morning?

MR. MCKERROW—But I am speaking of feeding in the winter.

MR. O'NEILL—How much does it cost to produce mutton?

MR. KERROW—A flock of sheep get a part of their living on the farm without much cost; they are good gleaners through the stubble fields after harvest and good scavengers and browsers, and take a part of their feed from the weed and bush that they meet in their way, so that it is pretty hard to figure, unless we make experiments.

EARLY LAMB RAISING.

By R. O. JUDSON, Farmington, Minn.

A Promise.

In an unguarded moment I promised to write you a paper on the subject of raising early lambs for market. Now, if there is anything I dislike it is to prepare a paper upon any subject, but as I have promised I will endeavor to keep my word.

I shall not give you the history of my ups and downs in sheep raising in Minnesota for fifteen years, and I shall not speak upon the merits of the different breeds, all of which, or rather the most of them, I have my private opinion.

I realized a few years ago that there was a good market for early spring lambs in St. Paul, and that the large hotel clubs and restaurants were getting their early spring lambs from Chicago and paying a good round price for the same, and I resolved to furnish that mutton, or at least a portion of it.

Read and Keep Posted Up.

I read all the literature I could secure on the subject and made my own experiments and here they are in a nutshell.

First, I secure after shearing the largest and best high grade ewes that I can pick up. I get them from one year up to four, dip them all so as to kill all ticks and parasites, tar their noses on account of the fly and turn them into good pasture. Keep them thrifty until August, when I have a new pasture to let them run in, get them up to the yard nights and give them a little grain, increasing the allowance until by the tenth day I am feeding a good winter allowance (the grain I feed being oats). This will soon bring the ewe around for service. July 1st I put up the bucks I intend to use in the barn away from all noise of the bleat of the sheep. I commence with a small grain ration and all of the good clover hay he will eat, increasing the ration of grain until each eats his pint of oats three times per day, and at time of service I have a good vigorous ram and his vigor will show itself in his progeny. After the ewes are through with their feed I turn one of the rams in with the flock and allow him to serve only one ewe when he is taken back into his pen in the barn and another is brought out if more than one ewe is to be served. In the morning the service is repeated and again at night and the same pains is taken until all of the ewes are served, keeping record of each ewe served. After all ewes are safe with lamb the grain feed is gradually withdrawn and they are kept on grass until late in the fall when I commence feeding bran and feed bran up to the day, and for two or three days after each lamb is dropped, when I commence feeding oats with the bran, feeding as is necessary to furnish a full flow of milk.

Clover Hay.

I feed my clover hay (which by the way is the only hay fit for sheep), on the ground in the yard. I have one-half acre yard enclosed with a good board fence, and straw, hay and corn-stalks in stacks built against the fence' except the north end where my shed is. My object is to shut off absolutely all wind, which is what kills the young lambs. I feed my sheep next to the fence all around the yard, putting the hay up against the fence. By feeding this way you require the sheep to travel backward and forward, in fact a sheep in eating hay this way hardly stops long in a place, and as I want my sheep to get plenty of exercise, they get it by hustling for their hay; and right here I will say that I think plenty of exercise, salt, with sulphur and bran, is just what a sheep needs. The bran keeps their bowels open, and hardly a sheep treated this way is feverish during lambing. I have discarded all warm barns for lambing, and, I prefer the open yard provided, of course, it is not storming. Of course I want the yard protected from winds. The best lambs I had, dropped in my yards with the thermometer 15 below zero. Out of 83 lambs dropped in the yard with the thermometer below zero, I only lost three and two of them were twins.

I found out to my sorrow that keeping ewes shut up in warm pens during lambing I lost 40 per cent. of my lambs and not unfrequently a few old ones.

Care of Lambs.

After my lambs are old enough to begin to eat grain by themselves, I make a little pen adjoining the one where the mothers are kept, and cut a hole through large enough to let the lamb through and feed them ground corn, oats, bran and oil-cake, and give them all they will eat up to the day they go to the block. I market my lambs dressed in St Paul, and get 20 cents per pound dressed from March 15 to May 15. Of course I have them dressed nicely, well trimmed and sewed up in good cotton cloth. My object is getting them to the market in first-class shape, as it is almost impossible to sell any dressed meat or poultry that is bloody and dirty, and placed in the market in a slip-shod manner. I commence shipping my lambs when they will dress 30 to 35 pounds. Now, right here let me advise all who intend to butcher lambs, to butcher them as soon as taken from their mothers, as a lamb will bleat himself poor in a day. There is much more that might be said in lamb raising, also in selecting the ewes, diseases that sheep are prone to run across, and trust some day that I may meet with you and then we can compare notes. I will close this by saying that the high-grade Cotswold ewe and the Shropshire ram is what *I* like, and the nearer full-blood Cotswold ewes you get the better.

EDUCATIONAL SESSION.

SMALL FRUIT GROWING UPON THE FARM.

By J. M. SMITH, President Wis. State Horticultural Society.

Strawberries as Cheap as Potatoes.

I do not appear before you this evening for the purpose of selling you trees or plants. I firmly believe that nearly every farmer in the state, can, and ought to have a full supply of small fruits for the entire year. My object is to try to convince you of that fact, and then give you a few directions as to the best varieties, methods of cultivation, etc. I shall not tell you that you can raise a bushel of strawberries as cheaply as you can a bushel of potatoes, as I do not believe that you can do so. Neither shall I tell you that you can raise 500 or 600 bushels to the acre, as I do not believe that either. I shall not tell you any unreasonable stories of any kind, so please give me your attention for a short time and I will try to convince you that you will add very much to the value, as well as to the comfort and happiness of your homes upon your farms, by having a full supply of desirable small fruits.

Let it be remembered that although we cannot yet boast of a general and complete success in growing apples and pears, there is no state in the Union, that can show a finer record in the yield of small fruits per acre than can Wisconsin. What then about soils? I prefer a rather damp, sandy loam, but if this is not to be had, let it be remembered, that any land that will grow a good crop of corn or potatoes, will grow a fair crop of strawberries, raspberries, blackberries, currants or grapes.

Another thing to be remembered is that any manure that will make corn or potatoes grow will make the above named fruits grow. As to the amount of land needed to furnish a supply for your families, it is safe to say that every square rod of land devoted to strawberries, and fairly well cared for, will give you at least one bushel of nice berries. Raspberries and blackberries will yield about two-thirds as much as strawberries; currants should yield at least four quarts to the bush, and grapes at the rate of at least three tons per acre. These are all very moderate yields, and you may easily estimate from them the amount of land you will require to furnish a generous supply for your family.

The Strawberry.

We will speak first of the strawberry. It is well to manure the land for this fruit, even if it is in good condition. It should also be so well drained that no water can stand upon the beds. In short, put it in as good condition as you would if you expected to raise on it 100 bushels of shelled corn or 250 bushels of potatoes per acre. As to varieties most desirable to set, I will say, if the Wilson does as well in your vicinity as it does about Green Bay, I truly believe that you will get more fruit from it than from any other strawberry plant in existence. It has a perfect blossom and needs no other near it as a fertilizer. Next to the Wilson with me comes the Manchester, and the Crescent. These last two named are both pistillates, and need some perfect flowering variety among them in order that they may do their best, or even fairly well. I have used the Wilson as a fertilizer by setting about one-third of the plants of this variety.

Go Slow Upon Novelties.

As to giving any advice in regard to to the hosts of new varieties, I will only say that in my opinion, the slower you go upon them the better it will be for your purse, and also for your peace of mind. Let the professional growers test them thoroughly, and when any really good variety is produced, the public will soon be made acquained with the fact, and you will be less likely to waste both your time and money. If you decide to set Wilson, and wish, as you probably will, to cultivate with a horse, mark the rows not less than three feet apart, and then set the plants 12 or 15 inches apart in the rows. In setting be sure to press the earth firmly about the roots of the plants, and if the weather is dry, give them a thorough watering. If you set the Crescent, the Warfield No. 2, or any other of these very strong growers, make the rows four feet apart, and set the plants 18 inches apart in the rows. Keep down all weeds and grass by cultivation, and go through them when in bloom and clip off all the blossoms so as to throw the entire growth into the plant during the whole of the first season. After the ground is frozen in the fall go over them with marsh hay and cover sufficiently to hide all the leaves, and leave them until spring. Straw is equally good for covering if it has no foul seeds to grow and choke the plants in the spring.

A New Bed Every Spring.

I find it better, and I believe quite as cheap, to set a new bed every spring, as the weeds and grass will come up and annoy you in the old bed; and even if you succeed in keeping them down for two or three years, the fruit is not quite as fine nor the yield as large as the first year. In selecting plants for setting I make it an invariable rule, never to set plants that have borne fruit. Be sure to have young and thrifty plants of the last season's growth, and do not set any others even if they are given to you. Leave the covering on in the spring, until all danger of hard freezing is past, and the young leaves are beginning to start. When I have followed this plan, I have never once had the fruit damaged by late frosts. It will be two or three days late in ripening, but the crop is almost a certainty. After taking off the covering I put on a dressing of fine manure, or what I like better, wood ashes, at the rate of half a bushel to the square rod, keep down the weeds, and in June and July, pick a fine crop of this queen of all the small fruits.

By following these few rules, I have not failed to have at least a paying crop in twenty-five years. The yields per acre have as a rule, been much larger than the amount I have named, as within reach of nearly or quite every farmer in the state.

Raspberries.

Give them the same kind of soil as the strawberries, and the same kind of preparation. For varieties I have never tried any that I like as well as the following: The Marlboro for the first early red, and the Cuthbert for the late red; the first named is with me a large and beautiful berry, and begins to ripen before the strawberries are gone, I believe we have never failed to have them both upon the table at the same time since the Marlboro came into bearing, though we do not consider them quite equal to the Cuthbert in quality. The Cuthbert is a large late berry excellent in quality and very productive. Among the blackcaps the Souhegan is nearly as early as the Marlboro, a good bearer, and of good quality; the Gregg is a large late berry, and with me an excellent bearer of fine fruit. If you wish a few yellow ones take the Golden Queen.

The above named will give a good supply of choice fruit from the beginning to the end of the raspberry season. In setting, the ground should be furrowed, making the rows not less than seven feet apart; then set the plants two feet apart in the rows, press the earth firmly around the roots and water, if the weather is dry. I always grow some other crop between the rows the first season.

Protect by Covering.

In the fall, and before the ground freezes, they should be laid down and covered with earth. In covering, if we wish to lay the plants towards the west one man takes a hoe or a common four-tined potato fork, and digs out some of the earth upon the west side of the plant; then another follows and bends the plant over towards the west until it lies nearly flat upon the ground; another follows and throws a shovelful of earth upon the tips of the plants to hold them in place, after which they are covered about one inch in depth. When danger from freezing is over in the spring, they are uncovered and raised up as near their natural position as convenient and the earth is again replaced where it was taken from in the fall. Then put on a dressing of manure or ashes and cultivate well and thoroughly. All weeds and grass that grow in the rows must, of course, be destroyed with the hoe. You will not get a full crop the second season, as you will of strawberries, but you will get some nice fruit. As soon as you are done picking the fruit, go through and cut out all the canes, as raspberry and blackberry canes never bear but one season; also, cut out the weak ones of the new growth, leaving only a sufficient number to have a good crop of fruit the following season. After this is done we go through with a pair of large shears and cut off the tops, leaving them about four feet high.

I am not sure that this is the best known way of trimming the bushes, but it is a very cheap and easy way, and I get large crops of fruit while practicing it. The red varieties propagate by suckers, and will always give you many more than are needed, which surplus must of course be destroyed the same as any other weeds. The blackcaps do not sucker, but propagate from the tips of their branches. Should you need new sets, go among them in August and bend over some of the branches of the strong thrifty canes, and throw sufficient earth upon the tips to hold them in place, when they will take root, and the following spring will furnish you with nice plants for setting new beds. My oldest bed of Cuthberts, some seven or eight years old, never promised better than this spring. The cultivation of blackberries is so similar to that of the raspberry, that I need not repeat what I have said. They need the same winter protection, and given in the same way, and if well cared for will last longer than the raspberries. During the last five or six years, a great deal has been said and printed in praise of the dewberry, or in other words, the running blackberry. I have been spending some time and money upon them for a number of years past, and if I had received one dollar per quart for all the berries that we have picked from them, I should still be some money out of pocket. I have already dug up a portion of them, and the balance of them will soon follow unless they do very much better than they have done.

Grapes.

The cultivation of grapes is so easy that I will say but very little upon the subject. We set the vines eight feet apart each way. They are trained upon a trellis, posts being set about 12 feet apart, and smooth wires stretched upon them.

We trim them in the fall, cutting the branches of the main canes back to two or three buds each. We then lay them down and then cover them with earth one to two inches deep and leave them until we think danger from frost is past. The Concord has long been the grape for the masses, and is still more generally cultivated than any other variety. Sometimes the season in the northern portion of our state is too short for it to do its best. With me the Moore's Early, Worden, and the Massasoit are all from one week to ten days earlier than the Concord, and the two last named are, in my opinion, much better in quality. I would not advise any one in this state to plant any grape that is later than the Concord in ripening, as there are a number of good varieties that I have not named, that I believe to be not only earlier, but better in quality, though I have not yet tested them sufficiently on my grounds to speak confidently of their merits.

Currants.

The currant is a northern fruit, and absolutely refuses to do its best in a southern climate. There is no fruit grown with us, that will bear as much neglect, and still have a small amount of fruit as the currant. Neither is there any that will respond more quickly to first-rate care and cultivation than this fruit. It is the only one of our garden fruits that will endure our most severe winters, and come out in the spring without a damaged bud. It is more than thirty years since I set the first currant bushes in this state, I have never given them any winter protection, and have never yet seen a bud damaged by cold. We set the bushes six feet apart each way, manure heavily, cultivate thoroughly and always secure a heavy crop.

For table use, it is doubtful if there are any better varieties than the old red and white Dutch. For other purposes, my wife thinks she has never used any that were equal to the Prince Albert and the Long Bunch Holland. They are much larger than the last named, and with me yield a much larger crop. We let from four to eight canes grow in a stool, and after they have borne a few years we cut them out and allow the strong young canes to take their place. In this manner they may be kept in full bearing for many years.

To Destroy the Currant Worm

We use White Hellebore, putting about half a tablespoonful into a ten-quart pail of water, and then sprinkle on a sufficient quantity to fairly wet the leaves. Its use will not injure the fruit or those who use it in any manner.

We trim the bushes any time in the fall after the leaves have fallen from them. I have in this brief manner given a few rules which if followed to a reasonable extent, and then supplemented by the good sense of our farmers and their wives, will, as I believe, enable forty-nine out of every fifty of them, to have a full supply of all of these delicious fruits, not only during their season of ripening' but also canned, or otherwise preserved during the entire year. The comforts and the happiness that may thus be added to our homes, is only known to those who have had a bountiful supply of them all. If among the many thousands who will doubtless read the Bulletin report of this closing institute, there are a few who will make a faithful and persevering effort to follow out the recommendations here given to supply themselves with small fruits, I shall feel that my efforts in preparing these remarks have not been in vain.

THE GOOD FARMER AND THE POOR FARMER---A CONTRAST.

By MRS. J. A. CLARK.

I propose by a few instances and examples to make a contrast between the good farmer and the poor farmer, and to show by their works their utterly different ways of doing things.

Care of Tools.

The good farmer takes care of his tools. After haying you will see him take his scythe and his rakes up to the top of the hay mow, so as to have them in a safe out of the way place, and fastten them up under the ridge pole. Next summer the scythe falls down on his head and cuts a slice off of one of his ears, and when he wants the rakes, he has to knock them down with clubs. The poor farmer leaves his scythe in a tree, and a man steals it, and he hangs his rakes on a fence and his wife gets them to rake the door yard with, and by the first of October, there won't be a tooth left in any of them.

Good, Convenient Buildings.

The good farmer may be known by his buildings, he has a three-story pig pen, and when a hog gets out, his wife and two oldest girls chase him around the garden till he gets hungry and goes into the pen for lunch; for the good farmer keeps no dog. The poor farmer has no pig pen, and when his pigs get out of the yard, he sets his three dogs on them and the dogs bite their ears off and make them baldheaded, and the boys mock them as they go by in the road, and the bears come down out of the woods and eat up those boys, as in old English time.

"Early to Bed and Early to Rise."

Is the good farmer's motto, and he turns out of his warm couch at five o'clock in the coldest winter morning, and then sits over the stove till daylight, by which time the hired man is up ready to help do the chores. The poor farmer lies in bed till eight o'clock, while his wife gets up and builds the fire and starts the boys off to milk. Look at the difference in their stock. See the noble grace with which the good farmer's horse carries that excellent man to church where he hitches him in the shed and when that spirited animal hears the soprano sing a solo, he thinks it is an engine whistle and kicks a $200 buggy to pieces, and nearly breaks up the meeting. Now mark the contrast. You will see the poor farmer's horse hitched to a post in front of a saloon, and the wind blows through him till the tears roll down his face and the people going by, pity him. About ten o'clock in the evening he shakes off his bridle and goes home, opens the corn crib door and eats in peace and quiet till mid-night, when the poor farmer comes home and sits up the rest of the night doctoring him for the colic.

Look at All the Surroundings of the Two Classes.

Take the wood piles for instance. The good farmer's pile will be straight and square and ten feet high all around. He will send his small boy out after an armful of wood and the pile will tumble over on to him, and they won't find that boy until the next summer. The poor farmer's pile will be scattered around in lots over the front yard and the boys will bring it in and lay it loose around the stove. When he comes home at night he will fall over it in the dark, and make a very big noise and wake up his wife. Just then the clock will strike two and he will have to explain to her how they have been initiating a man into the lodge and she will wonder how the Mason's hall can hold so many as they have been taking in lately, and how her husband can eat so many nasty cloves.

A Politician, of Course.

The good farmer takes an interest in politics, he subscribes for the weekly paper, published at his county seat, and finally runs for justice of peace on the temperance ticket and gets two votes. While all the paper the poor farmer takes is a paper of tobacco and he never gets any office. The good farmer reads and improves his mind, he is posted on all the new theories of government and tries to make his neighbors know all about it. He goes to the Grange and asks leave to read one of Henry George's nine-column articles. While he reads, the women grangers all whisper, and talk so much scandal about their outside neighbors, that war wages from that time forth in that community; while the male members go to sleep with their mouths open and the flies crawl down their throats and tickle them, and make them smile in their sleep. The good farmer thinks he is interesting them and like Tennyson's brook "runs on and on forever."

But the poor farmer, he goes down and plays cards and pool for his amusement and the only mark he makes in this world is a chalk mark, showing that he owes fifty cents to the saloon keeper. The good farmer reads the papers. He consults the monthly reports and the statistics of the agricultural bureau. He finds out that there is to be a war in Europe, and he knows that wheat will be $1.25 a bushel by next spring, so he goes to Chicago and buys 5,000 bushels and puts up $500 as margin and when wheat does go up three cents, he feels mighty good, and figures what he will do with the $2,000 he will make on this deal. And then it slumps and the margin is gone. When they ask him to put up more, he concludes that this wheat speculation is all a gambling business, and he will never have any thing more to do with it. The poor farmer takes no paper, and when the Bohemian oat man comes along offering to sell him oats at $10 a bushel and take all he raises at the same price, he buys ten bushels and gives his note for them. He puts the oats on the barn floor and the hogs get in and rip open the bags, what they do not eat the hens do, and he don't have one of those oats to sow next spring. By and by the man comes along with a hundred dollar note and the poor farmer has to put his farm in his wife's name, and give his brother-in-law a chattel mortgage on his stock to avoid paying it.

A Seeker for Knowledge.

The good farmer attends the farmer's institute—the Pomona Grange or the annual meeting of the state agricultural society. He goes to that and attends the Governor's receptions and finds him a first rate fellow and will vote for him every time he runs.

He is present at all the meetings of the State Agricultural society and hears such learned farmers as Jack Hinton and Mrs. Dr. Severance and gets his mind *full of ideas* and when he goes home and meets a neighbor he talks tariff to him and talks and talks until all the dogs in town howl before he goes within a half mile of them.

The poor man also has heard of the agricultural society meetings and thinks he will go to them and see if he cannot improve a little. But on his way up town he steps into a saloon to get a glass of beer and becomes interested in a game of pinocle in which he soon takes a hand, and then more beer and then pinocle and then again more beer, until toward night he gets noisy and a man strikes him and a big policeman arrests him and puts him in the cooler over night.

The next morning the judge fines him all the money he has in his pocket, and he makes his way home partly on the freight train and partly on foot, and tells his wife that those agricultural meetings are the best thing he has run on to yet, and what he has learned will be worth more than $300 to him when he comes to put in his crops.

I take one glance at the respective families and then close. Let me compare the children. The good farmer has good children. His boy is neat and well behaved, and is not out in the road "sassing" folks as they go by; no, he is in the house learning the shorter catechism.

When the circus comes round, though he looks anxiously at the bills—he could not be a boy and not do that—yet he recognizes the folly and vanity of such shows, and his parents not approving of them, he stays quietly at home while the procession marches by, content with the promise that if he is a good boy and works well the balance of the season, they will take him in the fall to the cemetery to see his grandfather's grave.

We all know the poor farmer's boy—there is generally six or eight of them. He is always in the middle of the road and *sasses* you as you go by, and you are lucky if he does not heave a rock at you. When the circus comes round he crawls under the side of the tent and comes up under the manager's eye, and the old baboon reaches out and pulls out the most of his hair. But he doesn't cry out or make a noise though he can't wear his hat for nearly two weeks after the show is gone.

The good farmer's daughter is beautiful and accomplished. Her education has been attended to. She can crochet and make tatting. You never see her idle. All the chairs in her father's house are decorated with tidies from her fair hands.

She can make worsted flowers and paint after the manner of the Grecian and the Orientals and knit open work stockings and has a hundred other accomplishments that I do not call to mind. If she does not always get married the only reason is that there is no one in the community good enough for her. If she wished she could have the pick of them—so her mother says.

The poor farmer's daughter has none of these accomplishments. She cannot even draw in rugs. She has to help her mother to make up for the faults of her father. In the summer she does the house work and in winter teaches school. Finally she studies medicine and takes her revenge on mankind by doctoring them.

I have given you now examples of the good and poor farmer. There was once a negro preacher who held faith in these words:

"Brethren," said he, "there are two paths; the broad and the narrow path that leads to destruction; the straight and the crooked path which leads to damnation. Which will you take?"

"In that case," answered one of the congregation, "dis nigger will take to the woods."

As Capt. Cuttle would say, the moral of this story lies in the application of it.

SOME HELPS TO HOME MAKING.

By MRS. J. M. SMITH.

A Good Garden.

Many really good farmers declare that they cannot afford to have strawberries and other small fruits, except as an occasional luxury. Well, if they are to be bought and paid for with the price of oats at 15 or 18 cents per bushel, and other things in proportion, of course he cannot afford it. Yet the very small area of land necessary to produce plenty of small fruits for an average family would not be missed from the amount of grain produced on the farm. He may say he has no time to plant or cultivate it; in fact, I know many farmers who seem to think their time would be as good as wasted in planting and caring for a vegetable garden; while, in fact, a single acre in small fruits and vegetables of desirable varieties, well cared for, will do more to promote the health and comfort of a family, to say nothing of the pleasure to be enjoyed, than any other acre on the farm. Only get the boys and girls interested in the care of a berry patch, and let them have a good supply for one year, and they will not be likely ever to forego the luxury afterwards.

In spite of all the poetry written about the happiness and beauty of life on a farm, the fact still remains that there are plenty of hardships for both farmers and their wives, and there is no danger of there being too much pains taken to bring beauty or pleasure, into or around their homes.

Earnest Young Men and Women.

The most valuable outcome of profitable and successful farm life is realized in the strong and earnest young men and women there trained up to build future homes, either on the farm or elsewhere; for not all ought to be expected to remain on the farm.

Our country would soon find itself short of capable men to manage its business affairs, and to fill places of public trust, if all the boys should stay on the farm. Then let farmers make the most of themselves and of their homes, thereby treasuring up for their children pleasant memories to help them when they go forth to try their skill in home building for themselves. Then while you see to it that your homes are well supplied with plenty of small fruits, there is still another side to be looked at.

Man Cannot Live by Bread Alone.

We are told in a very old fashioned book, that "man cannot live by bread alone;" and might we not add, neither by fruit and vegetables! There is, in my opinion, no way in which so much pleasure can be provided for a family, for so small an outlay of money, as by having fragrant and beautiful flowers around the home.

What shall we have, then? First on the list I would place roses, the queen of all the flowers. I can never forget the roses that grew around the home of my childhood. We enjoyed them while fresh, and when they began to fade we gathered the leaves and scattered them in our drawers and trunks among the clothing, and enjoyed their perfume until the roses came again. Then the lilacs and peonies, which yielded their beauty year by year, with but very little cost or care, were the delight of our childish hearts.

The perennial phlox in variety are very satisfactory later in the season, and give a long succession of bloom. I speak first of the perennials, because when once established they remain year after year with very little expense. Of course the list may be enlarged indefinitely, as taste and means permit.

But we must have a few of the many beautiful annuals, of which I would put first, pansies, with their infinite variety of colors and markings. I have often heard children compare them to baby faces, and I think the comparison very apt.

Flower Seed.

The seeds should be sown very early, in hot-beds if possible, but if there is no hot-bed a cold frame is, I think, much better than a box in the house, as the plants are likely to be stronger and more thrifty. Four pieces of board (which any woman who can use a hammer can nail together at the corners) will answer the purpose. This should be placed over a bed of mellow earth and pressed down at the bottom. If you have any unused windows, they may be placed over the frame, as this will make it possible to plant earlier without danger from frost; but if not, a piece of strong cotton cloth will answer a good purpose. Loops should be securely sewed on to the corners to keep it properly in place, and it will keep off quite a sharp frost. Make the rows from four to six inches apart, in which sow pansies, annual phlox (I prefer the grandiflora varieties), pinks, asters, candytuft, balsams and such other varieties as your taste may dictate. By raising nearly all your plants in this seed bed you can get better plants than planting the seeds where the flowers are to bloom; you will also have many more available plants, as they may be grown quite thickly in the rows, then you will also have the advantage of having but a small space to keep clear of weeds, as we all know that they will grow much faster than the plants that we are so anxiously looking for.

Care of Plants.

When the young plants are large enough to be clearly seen, carefully loosen up the earth between the rows, and sprinkle with water when needed. Then when the weather is warm enough for thrifty out-door growth, have the ground where you wish them to bloom carefully prepared, and transplant the young seedlings into permanent beds. If you cannot have a hot-bed, I would not try to grow verbenas plants, as they may be had from any florist for a trifling cost. I have mentioned but a few varieties of annuals, but every one may enlarge the list according to their own taste, or according to the time and labor that they may be willing to give to their care. A few plants well cared for, will afford much more satisfaction than many more if they are neglected. The ten weeks stocks and sweet alyssum, I always plant in a shallow box set up quite off from the ground, as if planted in the seed bed, the small black fleas will eat them up as soon as they come through the ground; while if grown in raised boxes, I never fail to get good, strong plants. All this may seem to be a great deals of pains to take for a few flower plants, but if you really love and care for the flowers, it will be only a pleasant change from your indoor cares. I forgot to put on the list of seeds the sweet peas and mignionette, which combined seem to be the very perfection of sweetness. One friend used to have what she called her glory-bed, which consisted of a good clump of sweet peas, surrounded by a border of mignionette. Then near her kitchen door she had a bed of bright portulaccas where she could see them as she passed out and in. She said their beauty rested her when weary. I do not think our Good Father over all would have sprinkled bright flowers so plentifully everywhere, if He had not intended us to enjoy them.

Then let us each bring all the brightness and beauty possible into our homes; they will help in educating and developing the characters of the children who are sent to us to cheer and brighten our lives. In the short time allowed me I have only been able to offer a few hints and suggestions, if they should prove any help or comfort to some tired or discouraged farmer's wife or daughter, I shall be content.

THE COMING FARMER.

By HON. J. M. TRUE, Baraboo, Wis.

It is not my intention, or wish even, to picture to you a man of physical, mental and moral perfection as the typical farmer of the future. Neither will I attempt to please you with highly colored sketches of the beauties and joys of farm life, the superlative grandeur of the farmer's vocation, or the mental and moral excellencies supposed to naturally cluster around the tilller of the soil.

That much is truthfully said that reflects credit upon the farm as the place from which strength and purity is drawn to replenish the vitiated currents of business, intellectual and social thought and action, I am pleased to admit.

That the present position of the best class of our American farmers is a desirable one, I gladly claim. They need envy no one. But that the condition of a large part of those living upon our farms is vastly inferior to what it should be, and might be, I am also forced to confess.

To consider briefly some things that keep the average farmer of to-day from being what the more successful coming farmer must be is the object of this paper. There are many farmers before me this evening whose active experience extends backward over a period of forty or fifty years. The wonderful changes that have taken place within that time in connection with agriculture alone are hardly realized by you even, so gradually has the work of progress been accomplished. Where wide stretches of native forest and prairie then met your view, cultivated fields and pleasant homes mark the advance of our American genius and civilization.

The Log Cabin of the Past.

The rude cabin of the early settler now stands obscurely in the shadow of the modern cottage as a reminder of the days of small beginnings. Commodious barns and stables indicate the channels into which, or through which, thrift and enterprise have led the prosperous possessor. "Old Brindle" has passed away with the primitive quarters erected for her comfort, while in the new stables the better bred and more aristocratic Short-horn, Holstein, Jersey or Guernsey are found. Poor "old Brindle!" what might *you* have accomplished had you been quartered in this model stable, fed a ration of ensilage, clover hay, wheat bran and oil meal, and drank warm water.

Old "Doll" and "Dobbin" plowed the fields, cultivated and gathered the crops, drew the grain many a weary mile to market, and then hitched to the same and only vehicle on Sundays, briskly jogged to the country church. Now the general-purpose horse is unpopular. The muscular Clyde or Percheron furnishes the motive power upon the farm, while the dashing roadster, in a nickle-plated harness, at a three-minute gait, draws the top buggy, in which the farmer's son sits and manipulates the lines. This new horse is not a church-goer. He goes, but not in that direction.

The farm implements of our boyhood, when muscular developments had a practical meaning, have given way to improvements that lightened labor and made it possible for a boy to do the work of ten men.

Modern Improvements.

The wives and daughters of to-day know little of the peculiar household cares of their grandmothers. The cooking range, the washing machine and clothes wringers, the sewing and knitting machines, factories for the manufacture of dairy products, illuminating oils, and many other lightners of toil have come to farmers' homes within my recollection.

Our mothers, fifty years ago, contentedly and well performed their household duties, without the advantages of these modern improvements, and knew little of that modern necessary evil—hired girls.

They were mistresses of their homes, and a conscionsness of their independence and natural resources contributed largely to that strength of character we so gladly ascribe to them.

The favored children of to-day seem to be born to a degree of intellectual and scientific advancement, that it would have taken ten years of application in the schools, for their grandparents to acquire, while our social and educational advantages as completely overshadow those of the past, as do improvements in any other given direction.

As the modern school building with its appliances and apparatus is superior to the old log school-house, with its rude benches and bare walls; so the methods and breadth of educational thought differ widely from the past.

An early acquaintance with good books, music, proper games and recreations, in our homes are comparatively new, but strong influences in moulding character, and nurturing that most sacred sentiment—a love of home.

We repeat,— the favored farmer's home to-day is one of the pleasantest in the land. Shall this condition become generally applicable to the class?

Get Out of the Old Ruts.

We cannot believe that the spirit of progress that has so signally blessed the American people in the past will fail to continue its beneficent work; but to expect that the coming fifty years will be as prolific of invention, scientific achievement, and intellectual advancement as the past fifty has been, requires a remarkable degree of faith in the unseen.

Farmers, as a class, are perhaps the most difficult to lead out of old, long traveled ruts, and into a *trial* even of that which is radically new.

They do not contribute largely to that changeful, restless element, that would keep society in a constant ferment, and render the foundations of government, even, uncertain.

If they are more persistently loyal to political and religious antecedents, than most other classes, they are also slow to recognize those lines of thought and action that lead up to the better methods and conditions in their own particular interests.

These peculariti es are largely attributable to the isolated character of their lives, to a failure to mingle in society, to assert their individuality, and to consult with the more successful and intelligent of their own class, about mutual interests.

Their narrow view of life leads them to harbor feelings of distrust and jealousy of those around them, especially the more successful of neighbors engaged in the same occupation as themselves; while better methods, better business habits and better education are regarded as delusions.

Intelligence and Prosperity.

If the average farmer of the near future can be brought to the general plane of thrift and intelligence, now occupied by the best representatives of the calling, this will be one of the great social and political events of the century.

To accomplish this the coming farmer must be intelligent in his work; he must recognize the fact that to be a successful farmer he must be a successful business man. No other occupation calls for closer discernment and intelligent action. The wide-awake farmer is not only a producer, but a manufacturer. He must therefore understand the nature of soils, the value and influence of fertilizers, and the laws that govern plant growth. He must be familiar with the principles of the breeding of farm stock, the general form, characteristics and adaptation of the various breeds of the animals he handles. He must have an intelligent idea of the profits he should derive from the enterprise in which he engages. He must have well defined ideas of the values and effects of feeds, that when combined they may produce required results. He will be a buyer and seller, and as such should cultivate a ready and correct judgment. He should study the markets from a consideration of the question of supply and demand, in order to buy and sell at a profit. Instead of being controlled by circumstances, let him aim to be in position to use them for his advancement. If the successful merchant deserves the title of *business* man, the successful farmer should have equal claim to the distinction. The coming farmer will be an active man in public affairs.

More Education.

Educational, social and political reform must receive a strong support from the farmer.

Such reforms are an absolute necessity to the maintenance and advancement of his interests, and only will he prosper as they are fostered.

The common school is coming to be more and more an institution peculiar to our rural districts, and the general tendency of advanced pupils from these, to seek better instruction in our village and city high schools has in itself an element of danger to the common district school.

Let not the intelligence and wealth of the country neglect the educational interests of the masses, because better instruction is available to their favored sons and daughters.

The farm will continue to be the best place in which to rear strong brainy men, and pure noble-minded women, and though these may not remain on the farm, but as in the past go out to give strength and character to business, intellectual and social circles in our crowded cities, in the future those who leave the farm will in no sense be superior to those who remain behind.

An Interest in Public Matters.

The farmer in politics! Yes, he has had his special province here. He has been a *voter*. Whenever political defeat overtakes a party at a given election it is charged up to a failure to vote on the part of the farmers.

The coming farmer will vote oftener. He will vote at the caucus, and as a result more farmers will vote at county and district conventions, and for these more farmers will be found deciding upon candidates for higher official positions.

I am finding fault with the present condition of things, only to say that the trouble lies with the farmer himself, in failing to intelligently and actively participate in movements that define lines of action and nominate candidates.

This need not produce class parties or

class legislation, but will lead existing parties to recognize general interests, and the necessity of the support of the well posted independent rural voter.

More Faith in Self and Business.

The farmer of the future will believe more strongly in himself and his vocation. He will recognize that no social, intellectual or political barriers are raised before him because of his occupation, but that in common with other classes he will pass for what he is worth, but no more.

He will, we trust, develop a stronger attachment to his farm, which will cause it to be handed down from generation to generation in an unbroken line of ancestry. It shall become to him his bank in which he may deposit accumulations of beauty, fertility, and comfort, and from which may be drawn elements of wealth and happiness for years to come.

When in the future our vast country has been developed; when a largely increased and ever increasing population shall demand that our agricultural resources be taxed to their utmost; when thrift and enterprise shall become necessary adjuncts to insure success; no place will be left for the average farmer of today, and he will unconsciously give way to the more successful coming farmer.

MISCELLANEOUS PAPERS.

WILD FLOWERS.

BY WERDEN REYNOLDS.

[Read at the Green Bay Institute, March 4-5.]

The Wild Flowers, the Wild Flowers, uncultured and true;
From nature's own garden—of nature's own hue;
No hot-bed distortions, nor monstrous forms—no—
'Tis thus that I love flowers as God makes them grow.

And thus do I love, too, affections of heart,
Up-welling spontaneous, untrammeled by art—
I love them all true, unaffected, sincere,
Like the beautiful Wild Flowers that God gives us here.

Then, gather life's Wild Flowers from young and from old—
Those grown in true hearts—the pearls and the gold—
Bind up a sweet nose-gay to cheer life's lone hours,
Mementos of dear ones in language of flowers.

The Hawthorne of HOPE, the CONSTANT Blue-Bell,
The PURE drooping Lily that blooms in the dell;
White Vi'let and Myrtle, so MODEST and MILD,
And Woodbine FRATERNAL all native and wild.

The Indian Jasmine ATTACHMENT TO YOU,
The Sweetbrier SIMPLICITY, Bittersweet TRUE,
The Orange Flower CHASTE, of so delicate tint,
And emblems of VIRTUE the Snow Ball and Mint.
The humble-born Daisy, to INNOCENCE dear,
The Osier of FRANKNESS, and Fern the SINCERE;
'Tis such flowers—the wild ones—most dearly I prize,
Earth's loveliest symbols of joys in the skies.

Yes, gather them all from the loved of my youth,
The Wild Flowers of sympathy, friendship and truth,
And wreathe their sweet symbols—with Ivy entwine
A garland of fragrance for memory's shrine.

"GATHER UP THE FRAGMENTS THAT NOTHING MAY BE LOST."

By DAVID F. SAYRE, Fulton, Wis.

[Read at Janesville Institute, Feb. 27-28.]

Low Prices.

On the third day of this present February, three weeks ago, one of my neighbors took six head of cattle to his nearest market and sold them for a fraction less than two cents per pound. Another neighbor sold on the same day and in the same market stall fed heifers, stall fed during the entire winter, at two cents per pound. Oats in the same market are sold at 20 cents and corn at 30 cents. We know that cattle cannot be raised for $2 per hundred, and a fair reckoning will make oats cost, I think, 21 cents, raised on land worth $40 per acre, and at 9 per cent. interest, and corn under like circumstances will cost 16½ cents.

What are we farmers to do? Will this state of things bring about the happy time when the farmer can lift up his head and feel that he is even with the rest of the world? Many farmers, and I am not sure that we here are not among them, say "appeal to congress or the legislature." But I can see no reason why we farmers should have laws passed favoring us as a class. No class has a right to be favored by legislation, although it is done to our hurt.

Save the Residues.

What shall be done? Some two years ago, I was sitting in a railroad car by the side of John Gould, that man who came from Ohio to teach our wives how to make butter, that man, who, I think, can show as much good sense in a butter talk as any man whoever came into our state. Well, he and I were talking about the great Standard Oil company, whose iron pipes, conveying the crude petroleum from the oil wells to the city of Cleveland, ran under a part of John Gould's farm. He told me that when the oil first came pouring into Cleveland, it was refined there, and the refuse, a black, filthy liquid, was turned into huge vats in the ground and burned, covering the city with a great, black, impenetrable smoke. All this was lost. After a little it was discovered that this refuse, treated by certain chemical substances, would yield naptha and benzine enough to pay for the whole cost of refining. There was still a residue, a refuse, which went to waste, until some one discovered in it parafine and aniline dyes, and these more than paid for the entire expense of refining.

Is there any way by which we farmers can treat the residues on our farms to bring about a like result? After we shall have cut our hay, or reaped our harvests or gathered our fruits, is there any residue, using which, we can lessen the costs of producing these crops? This question brings me to the point to which I wish to call your attention for a little time—the residues on the farm.

Nature's Fertilizers.

It is but a little time since we came into Wisconsin, we find these openings, these prairies, these lands, now turned into farms, covered by a carpet of green verdure, not one bare spot in sight grass and flowers, flowers and grass, and so it had been all the ages before. Nature, and when I say nature, I mean the God of nature, nature has been fertilizing these lands for us by the continued yearly growth, and yearly decay of vegetation, the snows of winter, and the verdure of summer, alike protecting and enriching the soil. We came and began our work, turning up the furrows and casting in the wheat. Not one year, not two years, but year in and year out, until we had taken from the soil in a good degree, the elements which made wheat raising profitable, then the soil refused to answer our calls, and we were forced to give up wheat. Isn't that your experience? Is not that the experience of all Rock county? Think for a moment what we had been doing; taking the wheat, the grain, which was perfectly legitimate, what did we do with the straw, the residue, the great bulk of the crop which came off the land?

Sell the Grain and Burn the Straw.

How many of you pioneers can hold up your heads, and with a good conscience say "we returned it in its best form to the soil from which it came, to help reproduce a new crop." Oh, the blazing fires of the straw stacks on the prairies of Rock county during the fifties and sixties. I don't want to throw a stone at a neighbor's glass house, but you may fling one at me, and if I wince at the blow, I'll bear it as best I can. One of the many reasons why wheat has fallen from 30 bushels per acre to 10 bushels or nothing, is because of this foolish waste of this residue, the straw.

Within a few weeks I have seen loads of straw going from the farms to a neighboring village for sale. It may have been right under the circumstances, but it was a part of the blood, and next year's crop will suffer from the loss of it. To return to the text, the straw is one of the residues, one of the "fragments, to be gathered up that nothing be lost."

From wheat raising we were driven by our own short sightedness in a good degree, to raising corn, a change for the better for two reasons, first, corn means hogs and cattle, and second, corn means a less severe drain upon the fertility of the soil. But in all those years succeeding wheat raising, what was our corn but a crop of grain, so many bushels of ears to the acre? How many years did it take us to find out that in every crop of corn there were two crops—the crop of ears and the crop of corn stalks. Have we really learned it yet? How many of us really think that the corn fodder is nearly if not quite, as valuable as the crops of ears? The saving of this residue, the working it up for all that it is worth, calls for the earnest attention of every farmer. On a cold morning out of a snow covered stack, to dig out the fodder for the morning's feed, the but of every bundle frozen fast, this is no light task, and if the boy shirks the work, and the cattle low for more, I am scarcely surprised. But even at the best, although the cattle get plenty, they leave the great, thick stalks on the ground uneaten, to be drawn out for manure in the spring, the stalks in whose cells is stored up the sugar which those cattle ought to have.

Better Methods.

There is a better way. A great many of you have found it, but some have not. A few days since I had occasion to call upon a neighbor, a young farmer, a bright, hard-working man. I found him on his barn floor with his hired man cutting up his corn stalks, handed down to him from his tobacco shed, where they had been housed and cured from the rains and snows of winter. I looked at the stalks, bright, soft, unbleached and greenish, worth at least 33 per cent. more than if he had stacked them out of doors; and then the gain in cutting—well, you must go to Prof. Henry if you would know the full per cent. in gain. I thought, as I looked at him, my dear young farmer, you are learning early in your farm life what we old pioneers learned only by hard rubs; and I thought, too, that that was the best use I had ever seen a tobacco shed put to. I speak of this, not as anything new to you, but something new to him.

This method is a great advance in husbanding this residue, yet, I think, if you will take my experience for so much, that the cheapest, handiest, easiest and altogether the most satisfactory way of caring for corn stalks is by means of the silo. I think, with the corn crib and the silo, we can well nigh gather up the fragments of the corn crops and little be lost. The point I wish to make is, that good farming—successful farming—demands that you save, not the ears only, but the stalks as well, in the brightest, most savory way for the stock which eats them.

In a late popular novel the author severely inveighs against the doctrines of a certain religious denomination, doctrines, which that denomination, in common with others, used to hold fifty years ago. In answer to this one of the critics of the novelist remarks that she has used her powder in "cannonading dead tomb stones." You may think, that in recalling to your minds the wastefulness of farmers in regard to the residues of straw and corn fodder, that I am aiming "at dead tomb stones." But I have noticed in the acres of corn stocks standing uncut in the fields to-day that there is constant evidence that there are plenty of farmers who need hot shot thrown at them for this very wastefulness.

The Golden Grain.

Another question I would like to ask, this corn, this golden grain, which comes to us with, comparatively, so little work, this grain which is so handy on the farm, have we learned how to use it in a way that will bring the best results, in a way that will give the most beef, the most pork? About Christmas day I was called upon to look at some pens of hogs, belonging to a well-to-do farmer, one who earned his money by hard work. There were some twenty-five or thirty hogs in three pens. They were fed by shoveling in to them corn in the ear by the scoopful to be eaten from the pen floor, swimming in filth, quantities of half-eaten corn were lying there utterly unfit for any animal to touch, yet these hogs were fattening for the market. By careful, cleanly feeding that farmer could have made a bushel of corn make him thirteen pounds of pork; thirteen pounds of pork at that time was worth thirty-nine cents (three cents a pound). He would have sold his corn for thirty-nine cents per bushel. One glance at the hogs and pens, would have satisfied you that he did not get more than six pounds for a bushel, eighteen cents for his corn; twenty-one cents residue lost, or at any rate not saved when he ought to have saved it. Just one year ago, Feburary 12, 1889, I weighed eighteen shotes to feed, the average was 174 lbs. During twenty-two days I made them gain one and three-tenths pounds each day. The next twenty-one days they gained one and four-tenths pounds each day. The next six days, I threw off all limits to my feed, I fed them a swill of ground feed, (corn, barley and oats), wet up with boiling water, all they would drink. I fed them the same ground feed, dry, all they would eat, as a relish, I gave them ear corn plentifully, but not so they left any over. All this in a clean house, with warm beds and access to the yard. I wanted and expected to reach two pounds each day. I did reach fourteen pounds for six days, and that, too, notwithstanding the shrinkage of a five and one-half miles haul to market. Each hog made me in gain sixty-one cents in those six days, I sold at $4.35 a hundred. Will you tell me why I did not make the same gain in those days before? Through lack of skill in feeding I lost part of the benefit of that corn crop. You have all of you had a like experience, only all of you have not weighed it in the scales as I did. It is attention to these minor details by which "we gather up tho fragments that nothing be lost"

Skill in Feeding.

This question of feeding is, I think, the least understood of the many problems of successful farming. There is many a good farmer, I mean raiser of crops, who is a very poor feeder. Many a mother, intelligent in many things, ruins the physical constitution of her child from unintelligent feeding. The great abundance of our corn crops makes us heedless in answering the question whether we get the best possible result from a given quantity of corn. I once bought some growing shoates at 9 cents per pound, paid $120 for them. Kept them 43 days, including the day I purchased and the day of sale, sold them at 7½ cents. In those 43 days I made them weigh me out $240.50, just double the price I gave for them and 50 cents over. I was so much pleased that I bought some more, heavier, more rangy ones. Kept them six months and over, lost money on them. The same corn kept growing harder during the summer and the teeth kept getting more tender, until they would eat only what would keep them alive. Why didn't I have thought enough, in time, to change their whole corn for ground feed. Ah, how much residue I wasted on these gaunt hogs. But corn in the crib was plenty, if they didn't eat when it was given to them, it was their own fault. When I wanted to turn them into money, they were gaunt still, and I was the loser.

Nature Conserves Fertility.

There is another point to which I wish to call your attention. In the beginning of this paper I spoke of our finding these prairies and woodlands covered with a carpet of verdure, grass and herbs and flowers the whole season through. That was Nature's process, never to leave the ground uncovered, never sear or bare. Then we came and broke up the sod, and sowed the wheat. You and I well remember with what delight we watched the crop of growing grain, during those three or four months before we reaped it. After the crop was cut off, during August and September, and October and November what? That bare field lay yellow in the sunshine, drinking in the rains of heaven, and allowing those rains to filter through the ground to the subsoil beneath. Nature had kept on the surface all the time a vast mat of foliage and rootlets, as a sponge, to catch and hold the fertilizing elements of the rains, and to keep them just where the growing crops needed them the most. We changed nature's law one-half of the year. Permit me to use an illustration which I have used many times before. Take a cylinder, hollow 1 foot in diameter and 3 feet long, drive down in the soil of your farm so that the top shall be even with the surface. Lift it now, soil and all and, set it on a table. Take some water surcharged with the richest fertilizing elements of your yards, and pour it into the cylinder. At first you will notice that the water, as it trickles from beneath, will be clear and bright, the fertilizers are left in the soil, and the water runs away clear. But if you continue the pouring in a little while you will see that the water, as it runs away, is just as turbid and yellow as when you poured it in, showing that now the fertilizers are carried down with the water, and lost to the surface where your plants are growing. This, it seems to me, is the process on our farms when they are left uncovered by a growing crop. I don't think I am firing at "dead tomb stones" now. Here are vast stores of fertilizers carried down by rain too deep for the rootlets of our growing plants to get them easily. Can we remedy this? Can we save this residue in part or in whole? In part, without doubt, you do remedy it, when you sow clover and timothy with your grain. That mat of clover, I am well nigh boyish again in my enthusiasm, whenever I see it. But in your corn crop, cannot we imitate nature, by sowing among the corn some grain, like rye, the last time we cultivate the crop, and let it grow during the trying months of fall. By so doing we shall profit by three residues, first, we shall have a growing plant to help keep the enriching elements of the rain near the surface where we need them; second, we shall have a good fall feed for sheep and cattle; third, by plowing under this green mass in the spring we have this easily decomposing crop for a manure. Are not these residues worth saving? Are not these some of the "fragments to be gathered up that nothing be lost?"

To speak of the residues of the farm, in the form of manures, the when and how to care for them, the when and how to apply them to the land, these topics could hardly be discussed in a paper by itself. Your patience would forbid me to enter upon them.

Success in Butter-Making.

But one point I want to touch upon before I close. I never approach the domain of a woman except with reverence. But let me tell you of a little scene which occurred some two years since. I came into the house one day and found the queen of the household working butter; don't smile, there is many a queen in Wisconsin who works butter. I looked at her and saw at once that she was tired out. "Oh," she exclaimed, "I had rather do a day's washing than work this hard butter," and then she drew the ladle through the golden butter with all the strength she could get from her elbows. She patted it, she smoothed it, she dug it again with the ladle, then rolled it over and worked it again, and so on for half an hour. I stood and looked at her until she was done. Her face, this face of a queen, was red and heated; her arms fell listless in her lap, her energy gone and her work a burden. I said nothing, but kept up a dreadful thinking all the while. When next churning day came I churned as usual, I had never handled a pound of butter in my life except to eat it, but I had heard John Gould's story of butter-making, and had told it again and again in the household. As I finished, I took off the churn lid, and by that time the queen was by my side. I kindly told her that she had nothing to do with that churn or butter. She remonstrated — some queens, you know, can remonstrate—I was firm; I took John Gould's method, washed the butter in the churn as nicely as a man could, salted it, had a butter pail on hand already soaked and salted, and then I began to take up the butter and pack it into the pail. Then the remonstrances began afresh. "No one will eat that butter, it isn't worked, there may be specks in it, they will throw it away, let me do it"; but the king was firm, the butter was packed into the pail by his own hand, and in a little while it was on its way to Chicago, with a letter telling the whole matter, and ending with, "You can throw it away, or pay me what you see fit."

In a day or two a letter came back saying, "it's such butter as we cannot buy for less than 30 cents; we cannot afford that, but will give you 25 cents if you can supply us." Butter was bringing, say 12 cents in the village. You can surmise that that queen has never worked any butter since, in that old fashioned way.

Moral 1.—The queen has a right, by reason of her queenship, her womanhood, to have the king's shoulders put under the burdens too heavy for her to bear.

Moral 2.—The energies of many a woman have been wasted on work which she had been taught was necessary, but which was entirely useless. The necessary cares and duties are wearing enough, without adding any unnecessary ones. We owe it to ourselves, to our homes, to skillfully direct the work so as to avoid all undue tension of the nerves, all wasting of the nerve force.

The Farm Homes Give Industry, Thrift and Character.

Please let me go into your home, let me see your home life. That boy of yours, strong, manly and stalwart, the world before him. You have used his best physical and mental energies during the season, to make that season a success. He has worked, if not willingly, at least faithfully to the end. You and I have, many a time, looked on and have seen with joy and pride, those youthful muscles and vigorous brains producing with the machinery of today, results which were beyond our reach 25 or 30 years ago. What in your estimation is the end of a farmer's boy's life? To get the greatest amount of work out of him, as you would out of that horse you prize so highly?

Don't Drudge, Drudge,

Drudge, all day long in the field, and in the house a listless weariness, which never catches or holds a smile, or gets a glimpse of commendation for the work done? In your house, are breakfast, and dinner, and supper dull, still meals merely to satisfy hunger? Across the table there, has that wearied mother of the household, that daughter, too, as well as the son, had their burdens lightened by any fun, any frolic, any story you could have told? and has any ray of sunshine come to them through you? Oh, how the taxed energies of your household, yes, and your own weariness, too, could be relieved by a smile, a bit of fun, an appreciation of what each one is, by giving in to innocent indulgencies, by cherishing a grateful, thankful, rejoicing heart yourself, and letting the over-flow of that grateful heart surround each one in your home.

Where Are the Papers and Magazines?

I don't mean the county paper merely, that is absolutely necessary, but the publications of art and literture. What books are in the library? Books of farming and feeding; all right, don't forget them. But remember that the boy's best book on farming and feeding is out of doors, that he has been reading it for twelve hours a day for 300 days in a year. How would it do to add to the library, for varieties' sake, some books of amusement, of history, travels, some books of biography, some novels, anything good, to draw blood to the brain, while the tired muscle rests. I say light books, too, so long as they are bright and good. Your girl or your boy, after working, say ten hours through the day, is not to be caught and held by a heavy book of sermons or history. If he can be held by singing, let him sing. The old-time singing school did as much good often as an old-time sermon.

The sense of the matter is, the energies of the household, of father, mother, son, daughter, are strengthened, enlivened, made healthy, by driving the farm out of the house while you are within, by winning a smile from the mother, by the radiance of your own face, by dropping a little money into the deft hands of your daughter to beautify your home, by teaching your son that goodness, cheerfulness, intelligence, manliness, independence and hard work will make the home of any farmer in Wisconsin the "palace of a king."

OUR HIGHWAY LAWS AND COUNTRY HIGHWAYS.

By D. E. McGinley, Secretary Ozaukee Agricultural Society.

[Read at Cedarburg Institute, March 13-14.]

The Farmers' Institute.

The farmers' institute is, without doubt, a valuable adjunct to the educational system of our progressive young state, and as a school of the farmer promises to do all that its most enthusiastic supporters expected of it.

It teaches the farmer numerous things that will improve his standing financially, politically and socially; but, thus far it has said too little to him on a question which is of vital importance to every live farmer, and that is: the construction and maintenance of good wagon roads.

The farmer may garner a most bountiful harvest, and yet fail to realize a profit thereon, owing to the fact that the bad condition of the highways prevents him from marketing it to advantage.

In these days of small margins the farmer, in order to make his vocation a lucrative one, must learn to watch the markets closely, and sell the products of his farm when the prices are the best. In order to do this he should have highways that, no matter whether it be March or September, June or December, will always be in good condition for the transportation of heavy loads.

Good Highways.

"Of all the economic questions affecting the welfare of the farmer and every good citizen; there is none of greater importance than the construction and maintenance of good highways, over which they may pass to and fro in their commercial and social relations with one another."

"The world," we are told, "is maintained by intercourse," and of all inventions, the alphabet and printing press excepted, those inventions which abridge distance have done the most for civilization. Every improvement of the means of locomotion benefits mankind morally and intellectually as well as materially, and not only facilitates the interchange of the various productions of nature and art, but tends to remove natural and provincial antipathies, and to bind together all branches of the great human family.

How often do we hear farmers discussing the financial situation, declaiming loudly against "corners" in the market, denouncing monopolies or demanding reform in every branch of our government, seemingly forgetting that they themselves are a part of this government, that *they* are much to blame for the short-comings of our laws, and that right here at home many of them make bad laws worse by shirking their duty in regard to them. Where is the intelligent, thinking farmer who has given the subject the proper thought, can deny the fact that the highways of Wisconsin are in a deplorable conditions, and that there is great need of reform in the manner of collecting and expending our highway taxes?

We are told that our highway laws are patterned after those in vogue in the feudal days, when, as one of their various duties, the tenants were obliged to build and repair the highways. Wherever it originated, our present manner (it is unworthy of the name *system*) of constructing and maintaining highways is common to a large majority of the states of our Union, and is a disgrace to our thrifty nation and the intelligence of the nineteenth century.

Some of the European countries, France, England and Scotland among the number, are now blessed with fine highways of which they are justly proud; but history tells us England was cursed with roads, the counterparts of which are so common in the United States to-day. It tells us that it was about the year 1760, that the people of England began the agitation which eventually forced her to repeal her defective highway laws, and to enact the system which to-day is her pride. At that time England's highway laws were similar to those now in force in the country districts of Wisconsin. The peasantry were required to give six days' gratuitous labor on the highways each year, and if that was not sufficient a cash assessment was levied to hire labor.

Their roads became so bad that the markets were actually inaccessible during certain months of the year; and at times the fruits of the earth rotted in one place, while at another but a few miles away, the supply fell far short of the demand, transportation was so difficult.

To remedy those evils, new laws were passed, but each law affected only particular parishes, and between 1760 and 1773 no less than 452 highway laws were enacted without making a material change. Finally a general law was enacted providing for a uniform system of collecting all taxes in money, and for constructing and repairing the highway throughout the kingdom, and from that time the highways of England steadily improved, until to-day a person can ride from one end to the other of that country, over a uniform system of scientifically built Macadaman Telford roads.

Our System, A Farce.

Is not the fact very discreditable to our inventive and enterprising Yankee Nation, that it is to-day wrestling with the inefficient highway laws that were discarded by England over a hundred years ago? Should not Brother Jonathan cease boasting of his greatness until he can have highways as good, at least, as his neighbors across the water? Over one hundred and fourteen years ago he rebelled against England's unjust laws, and yet when he came to set up a government of his own, he adopted some of her worst statues, among them the highway laws by which he is still oppressed.

Here in Wisconsin we have the county and town method of road control, the laying out, opening and repairing of highways and bridges being in the hands of the county and town boards of supervisors. The town board divides the town into what is called "road districts." In each road district is an overseer of highways, who has charge of the roads and bridges in his district, and whom the law intended should be under the control of the town board, and should be held responsible for the condition of the roads under his care; but in most towns the last two provisions are practically null and void, owing to the fact that the town board does not require the overseer to qualify as such officer.

The overseer is chosen by the electors of his district. If a vacancy occurs in the office the town board fills it by appointment, and in ninety-nine cases out of every hundred, the overseer lacks the technical skill and special knowledge of road-building that such an officer should possess.

At the annual town meeting the rate of the highway tax to be "worked out" during the ensuing year is fixed by the voters present, and many a voter makes it his special business to be "present," in order to work and vote for low taxes, be the consequences what they may. The voter from the clay district wants a four-mill or five-mill tax to put the roads in a possible condition, but his neighbor from the sandy district, which has plenty of gravel handy, says that the roads in his part of the town are "good enough," and that he thinks that a one-mill tax would be sufficient. Sometimes a division of the house is needed to decide the question, but generally it is decided by acclamation, when the low-tax men are sure to shout long and lustily, while a feeble response comes from their opponents, and dozens of voters stand around in disinterested attitudes, never opening their mouths, and a low rate is fixed.

The law says that two-thirds of this tax shall be expended before the first day of July. During the last days of May and the first part of June, the overseer, having received the "warrant" from the town board, calls out the men, boys and teams of his district, and for a few days does his best to make the roads worse if anything than they had previously been. Thus, after we have wallowed through the mud all spring, and just when the roads are getting dry and passable, they are attacked by unskilled crews under incompetent bosses, and are plowed and dug up and filled with loose earth and stones, while drainage is generally neglected or ignored.

The Macadam Road.

As Macadam says: "The whole science of road-making consists in furnishing a solid, dry path on the natural soil, and then keeping it dry by a water-proof covering of stone which should form a hardened, smooth surface fort ransportation;" but our overseers usually manage to build road-beds which will soak in and retain about all the water that falls on or near them. The first heavy rain that comes turns those "improvements" into guagmires, and in the latter part of June the farmer who is obliged to use the highways can be seen picking his way slowly along, while the wheels of his conveyance go down, down through the "improvements" until they reach soil that has not been disturbed by the "road-makers."

July's hot sun drys the artificial quagmires, and soon deep ruts and high hubs or hummocks are formed, over which it is dangerous to ride in a light vehicle, and exceedingly trying in any kind of a conveyance.

A railroad company has men constantly on its tracks, keeping them in thorough repair, but the wagon road has no one to care for it,—no mud-hole is drained, no rut is filled, no hummock is leveled, and when another June comes around the road is generally in a wretched condition.

Who is to Blame?

Nothing daunted the overseer again orders out his crew, and hauling gravel, which costs fifty cents to a dollar a load by the time it reaches the spot, dumps it into the mud-holes and ruts, and thus levels up between the hummocks, still neglecting to properly grade or drain. As a consequence new ruts and hubs soon appear; and thus the waste of labor and money continues year after year with little or no improvement.

Nor is the overseer entirely to blame for this squandering of the public funds. The law allows each man $1.50 for each day's work of eight hours; fifty cents a day for each wagon or plow, one dollar a day for each yoke of oxen, and $1.50 a day for each span of horses he may furnish, agreeable to the requirements of the overseer. Thus a man with a span of horses and wagon can earn $3.50 for each eight hours' work on the highways, when $2.25 or $2.50 is the current wages, laboring ten, twelve and fourteen hours a day at any other work.

One would naturally suppose that such liberal wages would induce the tax-payer to do his best to honestly earn them, but it is an undeniable and shameful fact that the cases are numerous where the tax-payer endeavors to do as little as possible during the time he is required to spend at road work, and thus cheats himself and the public in general. He is sure not to arrive on the ground until his more honest neighbor has worked a quarter or half an hour. Then he will have long stories to tell and must always cease work while he tells them. Again, he has his pipe to fill, an undertaking that usually takes up a good deal of his time, and he finds numerous other excuses for shirking his duty. Every little while he will stop, look up at the sun and wonder what time it can be, and is often heard assuring his neighbor that they have already worked over time. If he is ordered to bring a team, with wagon and "dump boards," with which to haul gravel, he sure to have low "side-boards" and no "end-boards," sure to avoid using a shovel to assist in filling his loads, and equally sure to avoid moving his team out of a slow walk during the whole eight hours.

Nor are the Taxes

Thus "worked" the only ones that we have to pay for the maintenance of poor highways. Special taxes are levied, payable in cash, and are expended on highways and bridges as the town board directs. While preparing this paper, I examined the highway records of a certain town in this state. It is a town which is not noted for good roads; but has the name of being a town whose public affairs are managed in a very economical manner. It was organized in 1848, in six miles square, its surface is principally high and rolling, and it has an abundance of gravel which is purchased on very reasonable terms. I found that during the last six years that town had expended $17,700 on its highways, or an average of $2,950 annually. Of that sum over $600 was annually collected and expended in cash, $185 a year being paid for plank and spike for small culverts, two-thirds of which were unnecessary. If this town, which can boast of its economy, squanders so many hundreds of dollars yearly, how many thousands must be wasted by an extravagant town in a like period?

If that town has collected $17,700 wholly in cash, and had expended it in a systematic manner under competent commissioners, it could have constructed at least eighteen miles of well drained, well graded gravel road, or, better still, twelve miles of macadamized road, besides keeping its other highways, in a passable condition.

One Hundred Years Behind the Times.

After a century of failure, is it not about time to try a change? That is what the intelligent men of this country are now asking; and the question of adopting a better highway system is being agitated all over the Union. New York, Pennsylvaina, Massachusetts, Ohio, Maryland, and Missouri have each made changes in their highway laws during the last year or two; but "that the reform may be thorough and permanent there must be harmony in legislation and unity in aim and purpose,"—a good, uniform system must be adopted throughout the Union.

Before railroads became so numerous some of the states built what were known as "state roads." These roads were paid for out of the state funds, and ran from one great market centre to another, back and forth across the state, forming a network of highways that were far superior to the other roads, and that were powerful factors in the development of the resources of the commonwealth?

The Times Require Better System

It has been suggested that that system should, in a measure, be revived. That all highway taxes should be collected in money. That the state should build and maintain the main roads—at least one or two in each county; the work to be done under the direction of a competent civil engineer, who should be a state officer and should have control of all state highways and bridges. Each town should have a commisioner or superintendent of highways, specially fitted for the office, who should have the supervision and control of all highway work ordered by the town board.

All bridges costing $1,000 or more should be built by the state. Often we find a town through which one or two large streams wind in such a manner as to necessitate the erection of a number of large and expensive bridges. Such bridges are of great benefit to the public in general, and it is unwise and unjust to tax one town the whole cost of their construction and maintenance.

It has been truthfully said that "he who seeks to change a long and established custom, is likely to be the most unpopular of men," for a time at least. He will be disliked by the timid and lazy, who fear the dangers and troubles of a change; he will be fought by those who are satisfied with the old though evil way, and he will receive little support from men who are conscious of the existing evils, because the remedies that he recommends will not act as a charm and instantly remove the ills. "Habit often becomes a second nature, and it is only by the positive pressure of evil that we are driven to reform."

But, farmers of Wisconsin, it is to your interest to work for this reform. Don't say: "Let us wait to see what other states will do." The Badger state seldom, if ever, waits for others to lead. She endeavors to obey the command expressed in her motto; and if you will enter this struggle with a determination to win for the right, our state will, in this, as in other great undertakings, move steadily and gradually forward.

HOW CAN OUR NOXIOUS WEED LAW BE MADE MOST EFFICIENT IN ITS PROTECTION OF OUR FARMS?

BY DR. R. J. WILCOX.

[Read at River Falls Institute, December 2-3.]

Canada Thistles.

The Canada thistle is a weed which seems to have demanded legislative enactment to protect the farmers of the states from its inroads for nearly one hundred years. In the meantime, while state after state has adopted laws for its suppression, year after year it has moved steadily, silently, and resistlessly forward, in its western march.

More than twenty-seven years ago our state enacted a law to suppress it. This law, amended from time to time, with its stringent provisions, stands today as a bulwark to protect our farmers from its occupation of our soil. Coming stealthily, none can tell when nor how, it finds a lodgment in our richest soil, and unthought of and unseen, it secures a foothold on the farm, and is seldom revealed till it appears, not as a single plant, but as an armed host, and he is above the average farmer in wisdom, who, considering the best mode of attack, is able to subdue and exterminate it, and avoid multiplying the pest with plow, cultivator and harrow.

That this most noxious of weeds is with us to stay, is no longer a question. In the counties of Pierce and St. Croix it has established its foothold on more than one hundred farms, which we can locate, and from these points, as centers of dissemination, it will in a very few years find a home throughout the length and breadth of this great valley.

When we listen to the experience of some of our Irish friends who tell us that oftentimes in Ireland before they could harvest their grain they were obliged to go with thick protection for their hands and expend from twenty to thirty days' labor in pulling up and carrying off the thistles from one acre of grain, one may perhaps catch a glimpse of the cost of cur crops in a time coming, too soon, unless unremitting vigilance and ceaseless effort by the co-operation of all our farmers enable us to stamp out and subdue this foe where it is.

When we increase the labor and expense of producing our crops without a corresponding increase in the amount and value of the crop, we depreciate the value of our farms.

In some portions of our state farms are found which have already depreciated from thirty to fifty per cent. in ther cash value, because of Canada thistles.

The farms of Pierce and St. Croix counties represent an invested capital of more than six millions of dollars. Permit these farms to become infested with these thistles and how soon will they depreciate in value five, ten, or even twenty per cent. Ten per cent. means a loss of six hundred thousand dollars, the result of slackness and indifference, becaue this pest has not yet come to your farm, that you know of.

A Good Law.

We have an excellent law, but it needs wise judgment on the part of the commissioner — vigilance, unflinching perseverance and thorough co-operation among our farmers to make it efficient. Many obstacles stand in the-way of its enforcement. In the first place, there is a too general ignorance of its importance and of its requirements. We doubt, if a majority of the towns listen to its perusal at the annual town meeting, as the law directs, or if they hear it, consider it of so much *personal* interest that it need be enforced.

A Live, Practical Weed Commissioner.

Again, the chairman who appoints the commissioner, is not always wise in his choice. Its duties are often delegated to the overseers of highways—a plan tried for many years under our former statutes and found inefficient in its results.

Again, the weed commissioner often thinks his whole duty done when he serves the notices required, and the ignorance or indifference of the farmers of his town, never suggests any liability of a fine on him for neglect of duty—though some of the noxious weeds are over-running every farm subject to his inspection.

Again, it is often difficult to learn where the noxious weeds are located, except as their presence is disclosed by their abundance—and then the task of destroying or removing, seems too formidable for any immediate accomplishment.

Again, it sometimes happens that the officers of one town are vigilant in their compliance with the law, while a neighboring town neglects its duties in this respect. It then becomes the duty of each and every farmer to whom this knowledge may come, to follow up this neglect, even if the fine is necessary. The law is ample in its provisions and its enforcement should be a matter of interest with all.

Again, a mistaken economy often causes the chairman to restrict the watchfulness and care of the commissioner so that he fails to accomplish and finish the work committed to his hands. This becomes especially apparent sometimes in the case of lands owned by nonresidents. The law requires the occupant to prevent the noxious weeds from seeding. In the practical working of the law the tenant is sustained in claiming he occupies only the land he tills. The fence corners, the roadsides, the waste places, where many of the noxious weeds find a safe retreat, are not in his occupancy, and therefore if attended to at all, must be under the supervision of the commissioner.

In one town we can name, three patches of Canada thistles for the past three years have grown, bloomed, and sown their seeds unmolested. Again, the freedom of action of the commissioner is restricted by the very general impression prevalent, that the time to reach these weeds most effectually, is when the seeds are nearest being fully ripened. Consequently, many deem the commissioner intruding, trespassing on personal rights, over officious, if he, seeing the ripening crop, insists on their destruction before they are ripe.

Again, the farmer crowded with his work in haying, sends the boys to destroy the thistles. They report having done so. He rests easily, but inspection shows the work imperfectly done, in boy-fashion, cutting the stalks so far above the ground that many branches with their crop of blooms and seeds are unharmed, an occurrence happening in several instances under our own observation the past summer among some of the best—certainly among some of our largest farmers.

But leaving these minor points which are easily remedied by the farmers when they understand the situation, let us consider the best way to exterminate the various weeds named in the law. This has been discussed by Prof. Goff, in *Bulletin* No. 20 of the State Experiment Station, and to which we shall recur very freely in these remarks.

Noxious Weeds.

The burdock (Lappa officinalis), is a biennial plant, that is, it reaches maturity at the end of two years from the seed and dies. If the stalks are cut when in full bloom below the crown it will give no further trouble.

The cockle bur, clot bur (Xanthium Strumarium) is rapidly gaining a general foothold in this vicinity. It is an annual and if faithfully followed with cultivation is easily kept in subjection. But while it seems at home in almost any soil, it is especially luxuriant on our dry runs, and is evidently spreading, by the water conveying and planting the seeds along their borders from which it invades the farms.

Sour dock, yellow dock and curled dock (Rumex crispus) is spreading very fast in this section. It is a deep rooting perennial plant, and if pulled and thrown on the surface will perish, but will retain for a long time vitality enough to grow, if it becomes covered with a little earth. It is very abundant in many portions of our country and threatens much permanent annoyance.

The ox-eye daisy, white daisy or white weed (Chrysanthemum Leucanthemum) is reported from four towns in Pierce and two towns in St. Croix counties. Summer fallowing or devoting it to a hoed crop is the plan recommended by Prof. Goff.

The snap dragon, also called by some toad flax, butter and eggs, (Linaria vulgaris) is one of our very noxious weeds when once it obtains possession of the soil. It monopolizes the ground, is very aggressive, and is difficult to exterminate. Prof. Goff recommends summer fallowing as the only effectual treatment. It has a footing in several towns about us and is proving more than a match for a single season's summer fallow. Perhaps repeated plowing while summer fallowing would subdue it.

The sow thistle (Souchus arvensis) is a perennial plant nearly or quite as difficult to destroy when established in our soil as the Canada thistle. It is reported in several towns near us and resists all ordinary means of treatment. A friend who has been contending with it for several years, thus speaks of his experience with it. He says: I have tried to subdue the sow thistle by thorough cultivation with corn, this will keep them from seeding if *thoroughly* cultivated, but the root stocks are loosened and scattered and the following year the weeds are more numerous than before.

The same is true of summer plowing, as far as my experience goes. I have tried it to some extent, but with little success. I have tried pulling them, but this only puts them back a little more than cutting, as the fine roots break off in the ground and send up new stems. Seeding to grass and pasturing will check their growth and prevent spreading and in parts where the stock travel back and forth a great deal will kill them, but this treatment will not exterminate them, for in land I have had in pasture eight years, and seen no thistle for five years, when plowed, I find roots of the thistle in some places, and these will send up stems and blossoms as soon as the land is cultivated. A heavy growth of clover seems to smother them out the best of anything I have tried, but it is hard to get a good catch of clover on land badly infested with these weeds. I have sown clover with oats on one piece of ground two years in succession and failed to get a catch of clover, this year I sowed the land to buckwheat, plowed that in when in bloom and then fall sowed rye. I thought that plowing the land in June and then immediately sowing the buckwheat which is a rapid and rank grower would be better than summer fallowing, then plowing under this crop I thought would smother the thistle roots to a considerable extent and the rye sown this fall would get a start a head of any thistle that might be left, and so keep them down, this is not yet proven, however. I have killed some small patches by covering with half rotten straw to a depth of sixten or eighteen inches.

Canada Thistle.

The Canada thistle remains for our consideration, and an examination of the experiments cited by Prof. Goff may aid us in solving the difficulties which surround the question of exterminating the weed. Some of our friends tell us that they have no fear of Canada thistles. They have had large experience with them and can kill them every time—in the meanwhile we can point to numerous patches established from five to fifteen years, treated with watchful care every year to some of the means which are so sure to exterminate, and every year has seen the patch spreading till the single plant of ten years ago now occupies a quarter to one-half acre, and of all the patches not one in fifty has yet been exterminated. Why this discrepancy in statement and fact? The experiments in New York, of Ambrose Stevens in 1841 to 1845, referred to by Prof. Goff, explain this: Three soils were tried: 1st, a strong clay loam intermixed with slate. The thistles here were killed by plowing nine inches deep in April and repeating till September in a very dry season. They did not survive the third plowing.

The second soil was shallow upper soil, vegetable mould, alluvial deposit and clay resting on hard pan. Three tests were made on this soil—fire heating the ground to hard pan, fire and salt, a plat soaked to the hard pan three times with strong brine. All these tests were completely successful—the thistles were destroyed in each case.

The third soil was a rich alluvial bottom; the roots penetrated three feet deep. Here plowing deeply six times from April to August only made the thistles more vigorous than before. This plat the next year was planted to corn May 2d, and plowed and hoed in June, July August, and hoed in September, but in October the thistles were more vigorous than ever. Salt and fire were equally ineffectual on this soil. Red top grass sward was tried, and wherever the grass became established it choked out the thistles. Timothy and clover on bottom lands failed. The last named soil in many respects would fairly represent the average soil of this portion of the St. Croix valley where we find the thistles. His conclusions are worthy of our careful study. Whatever will effectually exclude the plant from light and air will destroy it.

Wherever the soil is of a depth permitting the root to be reached and effected in its whole extent by the plow, hoe, fire or salt, the thistle may be destroyed by these means.

In all bottom grounds where the roots descend deep and the soil permits access of air, neither the plow, hoe, fire nor salt will destroy the thistle — here the grasses will be found the best destroyers. Whatever limits the *thorough* application of the means of destruction will proportionately diminish success. Hence, in many locations it will be found difficult ever to eradicate them, the plow will not reach the roots, and the roots will not grow thick enough to smother them. Sheep, salt and the scythe will have to follow them with ever watchful vigilance. One of our friends in an adjoining town says he has destroyed them on his farm after two or three years of faithful labor by destroying, every ten days or two weeks during the growing season, every shoot or leaf which appeared above ground.

Col. Dill, of Prescott, tells me he has made a very thorough test of kerosene the past summer, but without success.

Prof. Goff truly says that the past sixty years have added remarkably little to our knowledge as to the best means of extirpating this plant.

Such being the nature of it, already established in one hundred and forty farms in Pierce and St. Croix counties of which we know, and with twelve towns in the two counties not heard from, but with a reasonable presumption they are more or less infected, is it not time that the farmers of this valley should be awake to the coming of this pest, and very much in earnest in destroying it where established?

The question at once recurs, how far will the faithful enforcement of this law be sustained by the farmers. No commissioner can carry out the requirements of the law against the opposition and example of a very few of the leading farmers of his town. Very quickly would he find his footsteps watched and he be told he was partial, afraid to disturb the well-to-do farmer and quick to molest the poor, over-worked man of less pretensions. There should be an honest pride among all our farmers to so enforce the law for themselves, avoiding all occasion for the commissioner to visit their premises on account of any of the weeds named in this law. Many think the law well enough when applied to thistles, but of little benefit when applied to the other weeds it includes. Can the commissioner do his duty and discriminate between the weeds mentioned when he sees them permitted to grow unmolested. These are some of the questions for you to consider and aid the honest efforts of a faithful officer instead of opposing or treating with indifference his endeavors. Intelligence and experience will teach us how to meet the requirements of this law in the best way and in the meantime patience and earnest cooperation will make the law of value to all without disturbance to any.

CLOVER.

By C. H. Everett, Beloit, Wis.

Clover is King.

Of all plants raised on the farm the clovers are the most valuable. Clover is the only crop we can raise that will yield a direct profit, and at the same time enrich the land; it furnishes at one and the same time, the best hay crop, and the best manure crop.

But some farmers seem to think if they seed a piece of land in clover and let it lay for four or five years that land is enriched for all time, that is wrong, and shows a lack of knowledge as to the intelligent use of the plant. Clover should never be left down longer than the second year.

Sow With all Small Grain.

My method is to sow clover with all small grain, and when the crops are taken off at harvest time the whole farm with the exception of corn land, is green with clover, it protects the land from the burning sun, and later on makes good fall feed. One should keep up a rotation, sow every spring and plow up a portion every fall.

I always sow in spring just ahead of roller, I never sow more than six quarts, and have had a splendid stand from three.

Land plaster used in connection with clover can not be too highly recommended. We are told by learned men on this subject, that all vegetable matter while decaying generates ammonia, which becomes vaporized at 80 degrees, and consequently lost to the soil, but by the decrease of the temperature of the atmosphere, the ammonia is condensed with moisture brought down by dews and rain, the plaster being mixed with the surface of the land acts to hold and incorporate it with the soil, whereby it becomes fixed as plant food.

Increases Fertility.

I had a piece of land a number of years ago that had become so depleated it did not pay for cultivation, I sowed it to rye, and the next spring in March I seeded to clover on a light snow at the rate of six quarts per acre. When that rye came off that yielded, by the way, ten bushels per acre, I found a nice growth of clover, by not pasturing it in the fall, the following spring it was all alive. The first of May I sowed 100 pounds of land plaster to the acre, by the 15th of June I had a heavy growth for that soil. I commenced cutting on that date, cut it all down and let it lie; in a few days the second crop made its appearance, came right up through and grew very rapidly, when ready to cut for seed I used the old-fashioned reaper leaving it in windrows. I obtained from that ten-acre piece thirty bushels of clean seed that sold for five dollars a bushel. I then took the plow with sod jointer attached, and turned it over, plowing under the first cutting, the next year that land produced seventy bushels of shelled corn to the acre. Now how do we acount for the increased productiveness of that field in two years. I reason it out in this way. The long clover roots reach down into the soil absorbing fertilizing influences that are beyond the reach of ordinary vegetation, bringing them to the surface, and as I said before the ammonia brought down by moisture is caught and retained by the plaster the whole when plowed under is secured for the soil and held as food for the succeeding crops, and by plowing under as I did, the first growth of partially rotted clover, it had a tendency to loosen the soil and make it more porous. But were I to redeem an impoverished soil again, I would cut the first crop for hay, then sow plaster again and turn under second crop when in blossom. Clover, when properly cured, makes the finest kind of hay for all kinds of stock.

Curing Clover—Hay Caps.

We all know that to obtain the best possible results, clover should be cured in the cock, but to do this successfully the first requisite is the hay cap, for the average farmer with 10 to 15 or 20 acres of clover, five or six hundred will be sufficient, they cost $5 per hundred and are nothing more than good cotton cloth tear them off one yard square and hem the rough edge, tie a stout cord to each corner, fasten the cord to a smooth stick ten inches long, these are used to fasten them down, such caps, if taken care of will last many years, and they are almost water-proof when drawn tight, and will pay for themselves in one year in quality of hay. As soon as clover begins to look red all over the field, it is time to commence cutting. Many farmers make the mistake of waiting until the heads begin to turn brown, and before they are through cutting is very ripe, every change after the blossom is full is to mature seed, and the stalk is constantly changing to a woody, hard substance that is indigestible and worthless.

The mower should be started in the morning as soon as the dew is off, but never before, cut what you think will make 150 cocks, see that none is left in bunches at corners or other places, it should all have the sun for 3 or 4 hours, if the weather is favorable; by one o'clock or a little later it is ready to rake and cock up, it should not be put in great, large piles, but as the hay is green, it can be put into nice piles of medium size, the caps should be put on, and pinned down by sticking the wooden pin well into the hay. The next day repeat the operation, and so on until the end of the fifth day when you have got 600 or more caps covering as many piles of hay; on the morning of the sixth day, if the weather is fair, the first 150 caps should be taken off and the hay opened, by nine o'clock or when you have finished cutting for the day, it is ready to go in and the caps may be used again, so after the first five days you can cut and draw every day until done, your hay will not get wet nor will it all dry up in the sun, but it will come out of the mow in March bright and green, and every head and leaf is saved. Hay put up in this way stops drying up and sweats in the cock, and will not heat in the mow.

By the best possible results obtained by all other methods, one-third, and many times one-half, of the feeding value is lost, and it is poor economy in my judgment to raise 20 acres of clover to get the feeding value of 15, besides the handling, carting, storing, etc., of the five acres, only to cart it back on to the land in shape of poor manure. Ten acres of clover hay, cured as every farmer can and ought to cure it, is worth more than twenty acres of the coarse, woody, unwholesome stuff we find everywhere in abundance. Cut what you can handle and make first-class hay of, and plow under the rest. Invest a few dollars in hay caps and be convinced.

AN INTRODUCTION TO THE BEE AT HOME.

BY REV. JAMES BAIN, OXFORD, WIS.

[Read at Westfield Institute, January 23-24.]

Permit me to open before you an average swarm of bees for a five minutes inspection, that we who prize the product may become better acquainted with the producers or manufacturers, which may be turned greatly to our advantage.

I see even now alarm clouding many brows while you look suspiciously around to see a *real* hive brought forth with vivid recollections of some past experiences in which you and the hive suddenly parted company exchanging a long to be remembered smart for a sting.

Our hive will be but pictured to the understanding, an introduction by letter to the honey bee, associated with the history of man through all the ages of the past, giving to Israel's promised country the descriptive title of

"A Land Flowing With Milk and Honey."

Bee-keeping has become an important national industry, there being 300,000 bee-keepers in the United States, with an estimated annual production of 50,000 tons of honey. Our own county is not behind its neighboring counties in utilizing this very important channel of pleasure and profit which adds much to our national wealth.

The habits of the bee have been carefully studied by learned and scientific men in ancient as well as modern times, developing the fact that in all the annals of natural history nothing is found more interesting and wonderful than the internal affairs of a bee hive. An average colony contains 30,000 inhabitants, composed of a queen or mother bee, several hundred drones or males, and workers of undeveloped gender, the mass of the colony, the government of which is not monarchical, as many suppose, but purely democratic, which fact should produce political affinity. The queen, the only perfect female, seems to have allotted to her as sole duty the depositing of eggs in brood cells, prepared by the workers From 100 to nearly, if not quite, 2,000 are deposited daily, according to the season and weather. She can be readily distinguished from them by her size which is much larger. She certainly is the center of attraction among her people, who bestow upon her the great attractions and affections.

She possesses a sting but never uses it excepting in combat with a rival queen. Never goes abroad after her bridal tour excepting with a colony swarming, and retains her vigor about three years.

Drones, gentlemen of leisure, differ much from the queen in appearance, are less active, have no sting, no probosis for gathering honey, no basket for pollen, no socks for the secretion of wax which the workers have. In the latter part of summer they are usually looked upon as unnecessary and burdensome members of society and are put to death.

The Workers.

Workers are the sole laborers, bringing into the hive four substances out of which is produced all things necessary for the construction of the hive, raising the young, etc. 1st. Honey nectar of flowers extracted by a kind of probosis, stored in honey sacks and. carried to hive. This honey has to be prepared by mixing with it formic acid secreted in the bees' jaws and mixed with honey by vigorous stirring. 2nd. Pollen dust is used to feed young bees and cap over their cells as it is porous and very much cheaper. 3d. Propolis or bee glue obtained from the willow, poplar and other trees used to cement cracks and crevices and as stays to strengthen cells. 4th. Water to give drink to their babes and mix with their food. Wax or bee tallow is not gathered like the other material, but secreted under little scales underneath the abdomen. When wax-making, they eat honey and hang together in clusters while the operation proceeds, causing their owners often to judge them wrongfully, thinking them idle, The queen begins to lay as soon as pollen can be secured from blossoms, which is mixed with honey and water partly digested by the bee and laid in the cells with the eggs to feed the larva as soon as hatched. In about 3 days the larva hatch a tiny worm without legs. They are fed until about 9 or 10 days when they nearly fill the cell refuse to eat and are sealed over.

Around themselves they spin a silken sock changed from larva into a perfect bee coming forth in about 20 days from hatching, and 4 days later go forth as master workmen wearing out their lives during busy season in about six weeks.

Queen cells can readily be distinguished from other cells, much resembling an acorn cup and are placed in the comb vertical instead of horizontal in outer edge of comb.

Young queen bees are fed with royal food and come to perfection a few days sooner than the others. With this brief insight into the hive among its busy inmates another five minutes would give an outline of their culture drawn from my own personal observation and experience.

A Blessing to All.

That every farmer and fruit grower is benefited by a few bees in the neighborhood is now a well established fact. They perform an important service by fertilizing the blossoms of fruit-bearing trees and seed-bearing plants, mixing the pollen with the stigma of the flowers when in search of honey.

Therefore, although the manipulations of the apiary differ materially from the farmer and horticulturist each so contributes to the welfare of the other that harmony and good will can but exist. Let no one entertain the belief that any one can be a successful bee-keeper or that they can be kept profitably in all localities. A natural inclination or aptness for the business which can and must be developed by personal application as thorough and persevering as that required in any of the great branches of industry is necessary, and yet although but few have the faculties, time, means to become thorough apiarians there are few who may not aspire to ordinary proficiency which shall yield them a generous remuneration for labor expended. Especially would I recommend apiculture to adults of either sex in search of health who would find light out-door employment with genial mental exercise better than a medical course of treatment, with profits instead of doctor bills as their share of the enterprise. Many farmers, too, whose ambition survive their ability to do general field labor or oversight, might lengthen out their days profitably with a few bees. All necessary information can be secured by reading A B C of Bee Culture, by A. I. Root, Medina, O., together with some standard bee journal, such as *Gleanings in Bee Culture*, by the above named author, and the *American Bee Journal*, published by Thos. G. Newman & Son, Chicago, Ill., who also issues the Honey Almanac which reveals the fact that in the culinary art honey can be used instead of sugar in almost every kind of cooking, is pleasant to the palate and healthful to the stomach. An excellent article on the hygienic advantage of honey over all other sweets has been given to the public by Dr. J. W. Vance, of Madison, while from Mr. Tefft, good authority, we quote: "It is a true brain and nerve food. It gives refreshment and nutriment to mental and physical energies, new life to the weak and debiltated, relieves nervousness, improves the appetite, tones the system," etc.

Apiarians have their favorite breed the same as other stockmen, so that with beginners either the Italian, Cyprian, Syrian, Holy-Land or the brown German bee will sufficiently answer. Last season from 30 colonies of the German, or common black bee, I received about 2,000 lbs of salable section honey besides more than doubling the colony, yet I think the Italian is the general favorite. Bees do not work for nothing and board themselves, so pasture is necessary, consisting in this county of basswood or linden and buckwheat. Two of which must be in sufficient abundance within three miles to meet their demands. The old box hive must be laid aside with the sickle and hand loom as curiosities of antiquity and some approved moveable frame hive with supers and sections used., My experience with the Simplicity Langstroth and Wisconsin is that either is desirable, although I rather prefer the Wisconsin. Super honey in one pound sections are better in the ordinary apiary extracting, many yield greater returns but require far more time and skill with a less general market. Wintering in a dry cellar with a uniform temperature of 45° is my choice. Take them out when willow and soft maple are in blossom.

Put on supers as soon as clover blossoms appear. Feed weak colonies with honey or syrup made of coffee "C" sugar. Take honey to market crated in good shape so that the maker's name is a guarantee that all is as represented and all will realize the fact that we, too, live in a "land flowing with milk and honey."

HOME EDUCATION.

BY ALICE BALL LOOMIS.

[Read at the Lone Rock Institute January 2-3.]

'Tis education forms the common mind.
Just as the twig is bent the trees inclined.
—POPE.

The Common People.

Common minds like common people are the rule upon this earth of ours. Abraham Lincoln once said that he thought "the Lord must have specially loved the common people, for he made so many of them." Now, because he has made so many of them, it stands *us* in hand—"we common people with common minds"—to see that we make the most of our opportunities of securing the best education or the proper development of all the faculties of the mind. Our schools and colleges are doing a great work, but their efforts must be premised and supplemented by the education of the home to obtain the best results. Education begins with consciousness. From this time on, the formation of mind and consequently character are greatly the result of invironment. Rarely do we see a beautiful characrer rise lily-like from the mud and slime of social mire—rather are they the fruit of careful tending and pruning. The education which marks a character for integrity must be received under the parental roof. And no act, however small, but contributes its share to the making or marring of it.

The little toddler just becoming initiated in the mysteries of falling and catching itself, accomplishing the first, but failing in the second act, is perfectly capable of understanding that it was not the "naughty floor" that was to blame for the bump received. But how many mothers in giving their sympathy to the little one, blame the "naughty floor," and strike it for "hurting baby," thus giviug the first lesson in untruthfulness and teaching the child to shirk the responsibility of its own acts. Sympathy should always be given, it is one of the divine attributes of humanity, but never at the expense of absolute truthfulness.

All Eyes and Ears.

Figuratively speaking, a child is all eyes and ears, and the impressionable mind retains all of their communications. How necessary then that each childish inquiry should be truthfully answered, and that each act it witnesses should bear the stamp of genuine integrity. For the seed of dishonesty once sown, the *extent* of its fruition can not be computed. A carelessness in business relations, a neglect of the smaller affairs of life to the indiscriminating might convey an impression of dishonesty, and as discrimination is largely a matter of cultivation, we cannot expect children to possess it in any great degree. Therefore, even a seeming carelessness should be avoided and each adjustment of affairs, however small, should be made with such nice precision of justice as to leave no room for misconstruction. When we have given integrity for the basic principle of a character, we have a sure foundation, and whatever the superstructure may be it cannot fail to possess moral beauty.

The law of self-preservation which nature has planted so strongly in all organisms reaches its highest development in man in what we denominate the business faculty. And it is the province of parents to see that its principles are properly regarded—teaching by precept and example.

Industry and Economy.

The proper sphere of the business faculty is not of dominion. This is the abnormal development and therefore should be restrained—for the man whose intellect, love for his family and mankind are swallowed up in business, is indeed a pitiable object. For him the sun never shines nor the flowers bloom, he views nature only with an eye to what she can produce for him—he is dead in all that makes life worth the living. But, that care for *future* which provides for the physical and intellectual comforts, which is marked by industry and economy is the proper function of the business faculty.

In the household of the farmer especially the practice of these virtues is a necessity. The profits of the farm are not large and if obligations are met promptly as demanded by good business method and strict integrity as well, there is very little room for what in common parlance is called "style"—unless we close the avenues of culture to meet the demand, and to do this is to condemn our better selves to inanition and thus deprive us of the purest enjoyment of which human beings are capable. For the pleasures of the senses and the gratification of pride are not to be compared to the pure delight of intellectual and spiritual activity.

Habits of industry and economy are the prime factors in a business training with a skillful care and the higher faculties be not stunted or lost in *their* activity. In the process of education it is well to bear in mind that the *abnormal* development of our faculty means a corresponding latency of others.

The home culture of the intellect is too often neglected by the farmer. The long days of manual labor stupify the mind and deaden all desires but those that are distinctly physical. But with the coming of winter the stress slackens and a disposition for amusement appears.

The love of play is one of the properties of animal life and we do not look for the exemption of the human animal. But we do look for something more.

There exists a widely prevalent disease which could be properly named Intellectual Laziness. It is in a great *measure*, no doubt, the natural sequence of the too great physical activity which the law of self-preservation under our defective social system entails. But it is our duty to make the most of our opportunities and to make our opportunities, when within the bounds of possibility.

Amusements should be directed into intellectual channels when time is a consideration.

Culture and Information.

The daily conversations of the family may consist in the discussion of intellectual topics—history—its connection with the affairs of to-day. The schemes of government for the betterment of mankind. Biography, the debt of gratitude we owe to great characters who have made our existence in our present state possible, their emulation in all that our *added* advantages render consistent. Philosophy, its relation to our lives and literature with its pen pictures of beauty and love. Its dark characters that have failed to shadow forth the divinity that dwells within them, and met the reward that is meted to such and others who have lived the higher ideal life placing self a willing sacrifice upon the altar of truth—all of these things as annexes to the well selected and regular evening readings are fruitful topics of conversation.

Know Thyself.

There is growth and development in their assimilation, not only intellectual, but moral and spirtual as well. "With wider view come loftier goal." It has been said that "books are the grindstone upon which we sharpen our intellectual weapons," and it would not have been far out of the way to have added *moral* weapons. We do not expect a nice ethical perception in the African savage, but fill him with the contents of good pure books and we have a Fred Douglas. A miraculous metamorphosis!

No, simply an illustration of the potency of environment. Nature furnishes us no miracles, all is the result of "law and beauteous order."

"Yet I doubt not through the ages one increasing purpose runs,
And the thoughts of men are widened with the process of the suns."

It is man's high prerogative endowed with reason and volition by an infinite wisdom, to co-operate with that law. To develop his own mentality and to aid others to the extent of his ability is a duty that the quickened conscience can not fail to recognize, for the hoarding of a truth, whether through fear of ostracism or till such time as it shall become valuable among men is a crime against the universal law of evolution, the *intelligent* co-operation with which is the ultimate destiny of man.

Love of Country.

The subject of patriotism is at present occupying the thoughts of some of our people to a considerable extent. Perhaps the dearth of it in public places has aroused the people to the necessity of its cultivation. As a result of this awakening we have the nation's flag in our school room as a means of its inculcation. Patriotism is one of the higher virtues, but its roots lie deeper than mere respect for a symbol. Patriotism means love of country; it means a love so deep and broad that the nation's highest good is a chief consideration; it means a broadening of the family circle until it extends to the country's farthermost limits.

Patriotism never can be construed to mean respect for a symbol which is a shield for injustice. There was a time when our flag protected chattel slavery. Then its flaunting folds were synonymous of injustice and outrage to those pure souled patriots, the early abolitionists; but when the flag symbolizes justice and equality, homage is spontaneous and does not require cultivation. We can not be too careful that homage to the nation's flag and *patriotism* be not confounded. It is the privilege of the units upon which this government rests to say what the flag shall symbolize—whether it shall be partisanship or the dictates of a *pure* patriotism.

Aim at a High Ideal.

The home is the nursery of high ideals, great ends cannot be attained without them. A thing must first live in thought before it can be shaped forth to the world. The steamboat first existed an ideal in the mind of Robert Fulton before it sailed up the Hudson.

The ideal citizen has an abiding sense of his responsibility. He realizes that it is his business to know for himself, and to rely on his own judgment, for it is impossible to tell how far self-interest may influence the judgment of others. Goethe said: "Think for yourselves, even though you may think wrong."

The ideal citizen judges measures and men at the bar of conscience, and he does not give conscience a vacation when he goes to the polls in the exercise of the chief duty of citizenship. The ideal statesman is one who is capable of anticipating the needs of the goverened, who is above a bribe in any form, who *realizes* that the true function of government is the protection of citizens in the exercise of their natural rights, and that to do more breeds injustice. He realizes that governments derive their just powers from the consent of the governed, and that the "governed" are not all the male sex.

The ideal being of whatever calling is one who adds to professional excellence the exemplification of the golden rule in his intercourse with his fellows.

My chapter on the lessons of the home would not be complete if I omitted politeness. Some one is responsible for this comparison: "Politeness is like an air cushion; there may be nothing in it, but it eases the jolts of the world wonderfully." And I would have every one a Chesterfield, with the genuine kindly feeling which is the prompter of true politeness. Even the empty forms are active agents in harmonizing the little discords which are liable to occur in the home circle, and are therefore worthy of cultivation; for the discords once harmonized, the farms will not long remain empty. It might be charged that I have omitted the main feature of the home education should I fail to speak of religion. But integrity of character and the strict observation of moral precepts are the foundation principles of religion. That higher development in which the soul takes cognizance of its relation to the infinite and co-operates with it is an attainment which is the natural sequence of the self-abnegation which a higher sense of duty entails. The subtilities of theology should have no place in the education of a child. Give him a strong character and a matured reason and he will try all things and prove all things and come out the stronger for the conflict.

Have a Teachable Spirit.

People of advanced and middle age are too apt to think it too late in life for them to do anything in the educational line and leave the younger members of the family to work out their own salvation.

Home education should be co-operative, each member contributing his share. Such old sons as "you can't teach an old dog new tricks," should in white house parlance, be consigned to "inocuous desuetude." These oft-quoted lines of Longfellow seem to fit nicely right here:

It is too late! Ah, nothing is too late
Till the tired heart shall cease to palpitate.
Cato learned Greek at eighty. Sophocles
Wrote his grand Oedipus, and Simonides
Bore off the prize of verse from his compeers,
When each had numbered more than four
score years.
And Theophrastus at four score and ten
Had but begun his Characters of Men
Chaucer at Woodstock with the nightengales
At sixty wrote the Canterbury Tales.
Goethe at Weemer, toiling to the last
Completed Faust when eighty years were past.
These are indeed exceptions: but they show
How far the gulf-stream of our youth may
flow
Into the active regions of our lives
Where little else than life itself survives.

For age is opportunity no less
Than growth itself, though in another dress,
And as the evening twilight fades away,
The sky is filled with stars invisible by day.

TOBACCO CULTURE.

BY LEVI KITTILSON.

[Read at Stoughton Institute, January 2-3.]

This is a subject that is out of the general line of discussion at the Farmers' Institutes of the state, but to hold an institute here at Stoughton without this branch of farming on the program, to ignore a branch of farming that is so general in this vicinity, was undoubtedly considered unwise by the authorities. Although the use of tobacco is considered by all decent people as a vile and nasty habit, and justly so, nevertheless we farmers of this part of the state are perfectly willing to furnish all such foolish people with the weed, provided, however, as long as there is a profitable demand for the product, but of course at the same time pitying the young dude struggling to form the habit, as well as the older slaves to the use of the weed. I doubt if the southeast part of Dane county today would have shown the well cultivated farms, the fine buildings and the general prosperity of the farming community of this section, if the growing of this *vile stuff* had never been engaged in, but in its place had spent their energies entirely to the progenerating of the Jersey cow.

Sowing the Seed.

I have been successful in getting a good stand of plants by sprouting the seed in sawdust, and sowing it when well sprouted on newly fitted seed beds, tramping it down thoroughly with the feet. And for covering the seed beds, I have never known anything better than this so-called "tobacco cloth," sold by agents through this section. It is very thin and seems to be a sufficient covering to hold the moisture, and at the same time thin enough to get the full benefit of the sunlight, and will keep the plants a-growing right along. Last spring I used this kind of covering side by side with common sheeting, on plant beds that were sown at the same time, and in all respects exactly similar. A marked difference could be noticed from the start. Those under the "tobacco cloth" came up sooner, grew larger leaf and healthier looking plants from the start and were ready for transplanting fully ten days ahead of those grown under sheeting.

This cloth is sold through agents, and costs retail from 2½ to 3 cents per yard, and there is undoubtedly a large profit even at these figures, because the agents can be seen traveling through the tobacco growing sections in as fine "turnouts" as any of the farm implements agents use. However, it pays the grower to use it, as it enables the grower to get earlier plants, and earlier plants means earlier tobacco, and early tobacco is usually the best in this locality.

Preparing the Ground.

My tobacco field is on the edge of a prairie, consequently my experience will not hold good on clay or a hard soil, but on mellow land. My experience teaches me, that on such soil as I have, that to plow in the fall is only beneficial so far as plowing under second growth. Where there is not sufficient second growth to warrant it, I do not plow the land in the fall, but prefer plowing twice in the spring. The first plowing is usually done between seeding time and corn planting, plowing quite shallow, and afterwards planking it down smooth. Then I apply all the manure I can get, which is the only rule necessary in applying manure to a tobacco field. The second plowing is done just before the transplanting season commences, and we then plow as well as we know how. The more dragging, pulverizing and smoothing the better, as it is labor well spent because it saves labor in the cultivation of the crop, besides being in better condition for the transplanting by holding moisture longer. I have noticed fields side by side, where transplanting could be done all day after a shower in the field that was twice plowed in the spring and thoroughly fitted, while in the other field with the same amount of rain, but the ground was thoroughly fitted, the ground would be too dry in an hour or two for transplanting. Therefore, if this was the only consideration and benefit to be derived from thorough plowing and fitting the ground, it would more than pay for the extra labor.

Transplanting.

In the last year or two machines for transplanting have come into quite general use. As to their merits over and above the old fashion of back bending, I am not prepared to say, as I have had only one season's experience with a machine, and the crop also being destroyed by hail. However, I am going to use a machine for setting my tobacco this next year, and am of the opinion also that the last acre has been set on my farm by hand. My main reason for this belief is, to set more plants to the acre. I believe the great fault with us here in not getting as fine a quality of tobacco as the climate and soil will allow, lies in our tendencies to plant too many acres and the plants too far apart. If we would plant only six or seven acres where we now plant ten acres we could by making the soil rich and strong, plant just as many plants on 6 or 7 acres as is usually set on 10 acres, and get a much better quality of tobacco, and as many pounds, too, as are usually raised on ten acres. I saw a crop the other day of the Spanish variety which yielded 2,000 pounds to the acre. It was set 18 inches in the row and the rows a trifle less than three feet apart. The usual yield of Spanish tobacco is about 1,000 pounds to the acre, and the average yields for the state seldom go as high as 1,000 pounds per acre, thus showing that close planting does not diminish the weight of each individual tobacco plant, but that it weighs as much when closely set as when set far apart, besides being usually a finer quality.

Topping.

When to top, and whether to top low or high, is a question that growers differ in greatly. I believe that the tendencies of the majority of those that believe in low topping even top too high, and also let the plant develop too much before topping. We are liable to be penny-wise and pound foolish in this matter of topping. We may go into the field with the resolution to top low. We take hold of a plant below a large leaf, we look at it, hesitate, and finally say to ourselves "this will cure out," and the result is that the large leaves seen on the ground with the top when you first commenced to top, will gradually grow less in size and fewer leaves with the top broken off. In topping low the leaves spread more and makes leafier goods, and undoubtedly gives as good a yield per acre, if not better than when topped high, and the top leaf will be as good as the rest of the plant.

When to Harvest.

Any experienced tobacco grower can tell a green tobacco field from one that it about ripe; but when it is ripe enough is when we differ, and no wonder, because we know by sad experience that in some years our tobacco would cure out badly, being full of white veins, fat stems, green leaves, black leaves, etc., almost regardless of the time it had been allowed to ripen in after topping. It is usually conceded that the late tobacco will contain the most fat stems, but this year is an exception; the earliest harvested tobacco has more fat stems than the late tobacco. What is the cause? Can you tell? I certainly will not attempt to account for it. We have our theories as to the causes of these unaccountable freaks of nature, but experience tells us that our theories can not always be relied on. We all know that to enable tobacco to ripen it must be growing. In dry, cold and chilly weather, when the tobacco does not grow, it will ripen less in twenty days after topping than it will in ten days with warm showers and a hot sun.

Therefore, we cannot be guided by the number of days since topping, but by the actual condition of the crop, as to when it is ready for harvesting.

For inexperienced persons as good a rule as can be laid down for them to follow is to harvest when good-sized suckers appear the entire length of the plant. Another reason for the slow ripening of the crop is in allowing the suckers to grow until the time of harvesting. Tobacco can be suckered as much as five or six days before harvesting, if well and thoroughly done, and it will not be necessary to go over it again before cutting and harvesting. By keeping the suckers removed it hastens the ripening and thus enables the grower to harvest sooner and get his crops out of the danger of hail, wind and frost, which are elements that may change the question of profit or loss in a day or less. A grower feels comparatively safe when the crop is harvested, but before it is harvested and safely housed he does not know whether he will have a crop or not. Tobacco should not be allowed to wilt too much on the field before piling, because when wilted too much the leaves adhere to stalks and is more liable to defects in curing than when wilted only sufficient for handling without breaking. The practice of leaving cut tobacco out over night is also a bad practice, as you run the chance of having a shower come up during the night to spatter mud on it, besides a heavy dew is sufficient to make dirt adhere to the leaves lying on the ground.

The distance between the laths in the shed is a matter that no rule can be given for. There are so many conditions to consider, such as the location of the shed, whether it has a damp bottom or a dry one, whether your shed is surrounded by trees or is exposed to the wind from all directions, etc., and also what you *think* the curing weather is going to be. The kind of weather in the fall is the main factor, but the grower does not know what kind of weather he is going to have before it is too late to remedy his error in hanging his tobacco. I have a damp bottomed shed, and hang the laths usually from seven to eight inches apart, I have in some seasons had shed-burn at this distance apart, while these last two seasons it would have been better for the curing if the crop to have hung the laths only half that distance apart on account of the extremely dry weather. Thus we see that to procure a fine crop of tabacco, requires experience and thorough work, good judgment, and a considerable portion of good luck. Nevertheless an observant and thorough farmer—will succeed a part of the time, but a shiftless grower—hardly ever.

Stripping.

It is my opinion that tobacco should not be taken down before the weather has been cold enough to freeze the stalks, because it evens up the colors in the leaf, when next time the tobacco comes in cure. A tobacco stalk is green until it freezes and therefore does not help to color the leaf, but after a hard frost it becomes brown in color and when tobacco is in cure its juices run partially into the leaf and gives the color, but this is only my opinion with many other growers, while there are scores of others that practice and advise taking down and stripping as early as possible, so that this question is one of many that the "doctors disagree on."

Assorting.

Very many growers get an erroneous idea how tobacco is assorted in the warehouse by the dealers. A grower happening into an assorting room where a poor crop is being handled by a packer will wonder at the carelessness shown in the *assorting*, and will go home with the conviction that the much talked of warehouse sorting is a humbug, and when a dealer afterwards should happen to say to such a grower that his tobacco is good but poorly assorted the grower will naturally think such talk is all nonsense because he has seen the warehouse men do it worse still! The fact in the matter is, that a dealer when handling a poor crop *does not assort it all.* He merely sets his men to evening up as to length, called "sizing", and ties it into "hands" and pack it and send it to Europe for the foreigner to smoke, whose sense of smell is not so delicate as the inhabitants of this country have. A crop of tobacco that contains enough wrappers or even binders to warrant spending time and labor on, you will find the packer assorting with care every time. And on this point is where the grower frequently makes a great blunder by not spending necessary time and labor on a good crop, or sells it in the "bundle" for a song, or on the other hand spends a great deal of time and labor on an inferior crop, and likely as not asks fifteen cents a pound for it because some neighbors has received such a price. We should study the requirements of the trade as it develops from year to year and spend our time and labor judiciously and also be able to tell what quality of goods we are handling.

Packing.

If there is one thing more than another that spoils the looks of tobacco and hurts its selling value it is careless and poor packing. Tobacco should always be laid away straight and closely together at every stage of its handling, as well in the "bundle" before assorting as afterwards, besides tobacco once thrown carelessly together with the leaves sprawling in every direction, the tips of the leaves curled, etc., it is almost impossible to get it back again into good shape. And such tobacco is frequently sold for a cent or two a pound less simply for the reason of its defective packing.

CORN CULTURE.

By O. S. SISSON, West Salem, La Crosse county, Wis.

The culture and production of corn may properly be divided into "three" classes as follows:

1st. The soil and preparing it.
2nd. Seed and planting.
3rd. Cultivating and tillage.

Preparation of Soil.

In presenting to you the subject of soil and preparing it, we must say that in our observation as a farmer for the past 23 years, we find that there is too much "hap-hazard" and wrong ideas maintained; that corn planted on any kind of ground, with all of the different kinds of soil that Wisconsin has, can be made successful and profitable to the producer.

Observation has led us to believe, that many fields are annually planted when the fertility is poor; also on side hills that will wash away when the frequent rains come, or on low, wet ground which cannot be cultivated, and put in proper condition for planting, at a date to fully mature in the fall before the frost comes, and lessens the crop from one-third to one-half.

As has been proviously mentioned all kinds of locations and ground are not suitable for corn.

But we would dispel the "delusion" that corn is not only "King," but one of the best paying crops for the farmer, and can be enormously produced on most any kind of soil, where the *fertility* is properly preserved; and this can easily be maintained by the free use of "clover," and an annual ration of crops. Should the fertility of the soil, through excessive crops or other causes, be exhausted, sow to grain and seed down to clover, with not less than six quarts per acre of clover seed. The following fall and winter take the litter from the horse stables, and cow stables, and haul directly to the fields and spread, as fast as a load accumulates. And continue in so doing until the fields are too soft in the spring to go on to them, as they should not be trampled upon while the frost is going out, and not until they become quite firm and solid. If sufficient time has not been secured to complete dressing of the field, it can be continued (ordinarily) until about the 10th of May, when it should be thoroughly dragged with a smoothing harrow, then it will not impede the cutting of the grass.

If the soil has a mixture of sand and clay, great results will be received by sowing from 50 to 75 pounds of plaster per acre, by which the clover will receive immediate benefit, which will also help in restoring the fertility.

Make a specialty of cleaning up all of the old straw stack bottoms and yards where horses and hogs and cattle have been kept, and finish dressing the field atter haying.

No fears need be entertained by spreading of the coarsest straw or manure, as the clover will soon grow up through, when it will readily rot. and furnish food to make strong and vigorous roots to the plant. And at your plowing which may be done in September or October, at a depth of five inches, you will not find the soil in a doughy and heavy condition; but in light and good order, which will pulverize up freely and finely, and should be leveled with a harrow before the ground freezes up in the fall, which will greatly facilitate the time in the spring, as well as improve the condition of the soil.

In preparing the ground in the spring for planting, it should be commenced as soon as dry enough, or at an ample date to secure early planting.

Not waiting as old "fogy" notions would have it; for the sweet tones of the "Lark" and "Whippoorwill," but commence at once. The surface of the ground to the depth of two inches should be thoroughly pulverized and made fine with farm implements. We use the Gorham seeder and slanting tooth drag, and go over the ground twice with the seeder, and twice with the drag before marking, which is sufficient not only in properly fitting the ground. But in eradicating all early weeds that have a tendency to start.

This system of restoring "fertility" to worn out land is just as applicable when the field is used for pasture, and can be followed with corn with equal results.

Under the head of class second seed and planting, comes a very important part of the success of the crop.

Seed.

The seed should be selected from the loads at husking time when the "best," "choicest" and *purest* ears can be sorted out, and a place secured where the heat of a stove will dry them out sufficient to shell in about four weeks, and before it will *sour* or *mold* on the *cob*, thereby injuring the germ or sprout, which seriously retards the growth. In regard to the variety we would say: If corn is your principal object and you wish to secure large yields, a staple variety of the "yellow" dent is highly recommended.

Planting.

Circumstances and conditions of the ground sometimes make it preferable to plant in hills three feet eight inches apart, which is usually better adapted in working the cultivator. If planted in this manner an average of three and a half stalks to the hill is sufficient.

As the seasons are not alike, we are somewhat governed by the time and indications of the weather "prospective" to the time of planting. We have planted as early as the 27th of April and as late as the 12th of May, and in each case had good corn. Though as a rule we consider late planting more risky, as three frosts in the spring are preferable to one in the fall, before the maturing of the corn.

The best results are usually obtained by not planting over an inch in depth, also before the ground becomes too dry. Many fields are made a failure by late planting followed by a few weeks of dry weather, in which there is not enough moisture to swell the kernel and start a growth.

The utmost care should be used in regulating the *planter*, and watch the depositing of the kernels as to the required number.

We will give you one incident where a farmer got behind with his planting, and in a desperate hurry repaired to the field with helpers, when the click of the planters could be heard, showing a lively pace throughout the whole day in order that the field might be finished.

Meanwhile the required amount of seed had been taken to the field and placed in care of a six-year-old son to watch while they were making their rounds, as there was no time to fix *pens* and *fences* and "pigs" were free commoners.

The weather being favorable it needed only a few days before the corn began to come up. But, to the astonishment of the farmer, a majority of the hills were limited to "*ones*" and "*twos*."

He remarked, in the presence of his youthful son, that the seed which he got from his good neighbor must be poor, as the planters worked good two or three years ago, and a second tour was made to the field for examination.

The father yielded the point when the son showed him his hills he had planted in his arrangement of the fox and geese ground; and he only put in *two* quarts in each hill.

Cultivating and Tillage.

"Cultivating and tillage" is the last but not *least* consideration in which the farmer leaves his crop in condition for nature's "development."

And by so doing he will be in readiness when the weather is favorable and the ground not too wet; and give the field one or two good harrowings before it gets up, which should be followed by weekly cultivating until the "tassils" are quite conspicuous.

Corn should be cultivated at least six times, we frequently run through ours the seventh. Cultiuating after tassiling out is beneficial if the ground is not stirred to deep to injure the roots.

Please remember when corn is three to four feet high the roots are about of equal length and form almost a solid mat from two to eight inches under ground across the rows.

With ordinary seasons and previous good management, not much hoeing need be done. There should be a few days of spare time between haying and harvesting, when a person can go over about five acres a day with a hoe, and cut down all weeds that have been left and are likely to go to seed, which, if left, not only help to use up the "fertility" neccessary for the crop in its advanced stage, but are serious "eye-sores."

No doubt many of you who are present at this meeting today, were observant of the fact that, owing to the repeated frosts of last spring, some were in a state of "disparagement" and openly avowed any possibilities of the maturing of a crop, and many fields were thus neglected. While those of you, who did not propose to be thwarted, and let the weeds predominate, and took the time and eradicated them were bountifully rewarded.

"Narrow, indeed, must be the scope of one's business, wherein arises no time for the "destruction" of "weeds." "Retribution surely overtakes wrong-doers."

A Low Average.

Before closing this subject we wish to inquire how many there are here, who wish to be classed under the "head" of "*average Wisconsin farmers?*" Who, according to the secretary of agriculture says, only produce 26½ bushels of corn to the acre. Let us see where the profits come in. It costs six dollars per acre to raise corn. Add to this four dollars more for rent of land—which equals ten dollars, "actual cost." Now, 26½ bushels (the average for Wisconsin farmers) at 30 cents per bushel, would bring $7.95, which shows a loss of $2.05 per acre.

Now, this estimate shows on the face of it, there is something wrong, and such yields can not be tolerated with any degree of success. Each and every farmer should try and lay a foundation for better yields, which only can be done with renewed fertility and proper cultivation.

In this system as given you, we have been able to produce at one time, 82½ bushels of shelled corn per acre, from a field of 10½ acres. The yield was ascertained as follows. Each load was counted and set down as fast as husked. Three average loads were weighed:

First load weighed 25 bushels and 30 pounds.

Second load weighed 26 bushels and 15 pounds.

Third load weighed 25 bushels and 40 pounds.

But they were called an average of 25 bushels to the load. The number of acres was ascertained by counting the rows each way, which would make it aproximately correct. Last year we made an other estimate from a field containing 13 acres. A double box found to be 10 feet long and 26 inches deep would hold 45 baskets. The total number of loads was 52. Measurement of ground by rows, this yield was found to be 180 baskets per acre.

These figures may seem rather astounding to some, but this may be somewhat lessened, when we stop and consider that there are 3,240 hills on an acre when planted 3 feet 8 inches apart. If they produce 4 ears to the hill, and each ear weighs one-half pound, you will have 92½ bushels per acre of shelled corn, or if you can grow three ears to the hill, with an average of one pound to the ear, you can produce the "enormous" amount of 276 bushels of ears per acre, which equals 138 bushels of shelled corn.

But, says one, can ears of this size be produced? To this we would say "yes." The fall of 1888 and the fall of 1889, we had ears on exhibition at the *Journal* office in West Salem, that averaged over a pound and a quarter, which was witnessed by many people.

Thanking you for your kind attention, I leave the subject for your consideration.

DAIRY EXPERIENCE.

BY DR. C. V. PORTER.

[Read at the Viroqua Institute, Jan. 14-15.]

In the winter of 1888-9 I commenced using Short's test in a dairy of twenty-eight cows. I did not purchase a complete apparatus. I sent to Greiner, 63 Maiden Lane, N. Y., for a dozen bottles graduated on the neck, and for a ten and twenty cubic centometer pipette, the smaller for measuring acids, the larger for milk. The chemicals I had prepared by our city druggist. The alkaline solution is now made of one pound Babbits' Potash to two quarts soft water. The acetic acid used should be the U. S. P. acid, sp. gr. 1,047. The tin man make me a water bath (an eight quart pail with copper bottom), for a rack for the long style of bottles I took a tin maple syrup drum and made a dozen holes in it for bottles and holes in bottom and sides to admit water. Thus for less than eight dollars I had a twelve bottle test apparatus with chemicals for two or three dozen tests. The cook stove took the place of a lamp.

Fourteen of the twenty-eight animals tested were half-blood Jersey heifers 19 to 28 months old. This accounts partly for an average yield of only 155 pounds.

The following table gives *approximate* amount of butter made by each cow, together with number of pounds over or under estimated cost of keep, and estimated profit or loss given by each cow for the year ending September 15, 1889. This statement is predicated on butter product alone, not reckoning growth of heifers, calves, skim milk or fertilizers into the account:

Average Cost Yearly Keep of Cow Estimated at $25.00. Butter for Test Year Netted About 19 cents per Pound; Hence it Took 133 Pounds of Butter to Support an Average Cow.

	Profit or Loss.
No. 1 made 321 lbs. buttter, or 188 lbs. over cost of keep	$35 72
No. 2 made 183 lbs. butter, or 50 lbs. over cost of keep	9 35
No. 3 made 271 lbs. butter, or 138 lbs. over cost of keep	26 22
No. 4 made 174 lbs. butter, or 41 lbs. over cost of keep	7 79
No. 5 made 217 lbs. butter, or 84 lbs. over cost of keep	15 96
No. 6 made 117 lbs. butter, or 16 lbs. less than cost of keep	3 00
No. 7 made 143 lbs. butter, or 10 lbs. over cost of keep	1 90
No. 8 made 135 lbs. butter, or 2 lbs. over cost of keep	38
No. 9 made 148 lbs. butter, or 10 lbs. over cost of keep	1 90
No. 10 made 196 lbs. butter, or 63 lbs. over cost of keep	11 97
No. 11 made 127 lbs. butter, or 6 lbs. under cost of keep	1 14
No. 12 made 152 lbs. butter, or 19 lbs. over cost of keep	3 61
No. 13 made 149 lbs. butter, or 16 lbs. over cost of keep	3 04
No. 14 made 183 lbs. butter, or 50 lbs. over cost of keep	9 50
No. 15 made 186 lbs. butter, or 53 lbs. over cost of keep	10 07
No. 16 made 81 lbs. butter, or 52 lbs. under cost of keep	9 88
No. 17 made 169 lbs. butter, or 36 lbs. over cost of keep	6 27
No. 18 made 185 lbs. butter, or 52 lbs. over cost of keep	9 88
No. 19 made 185 lbs. butter, or 52 lbs. over cost of keep	9 88
No. 20 made 20 lbs. butter, or 113 lbs. under cost of keep	21 27
No. 21 made 128 lbs. butter, or 5 lbs. under cost of keep	95

No. 22 made 258 lbs. butter, or 125 lbs. over cost of keep	$23 75
No. 23 made 114 lbs. butter, or 19 lbs. under cost of keep	3 61
No. 24 made 90 lbs. butter, or 43 lbs. under cost of keep	8 17
No. 25 made 179 lbs. of butter, or 46 lbs over cost of keep	8 74
No. 26 made 65 lbs. butter, or 68 lbs. under cost of keep	12 92
No. 27 made 113 lbs. butter, or 20 lbs. under cost of keep	3 80
No 28 made 67 lbs. butter, or 66 lbs. under cost of keep	12 54

If my tests are nearly correct it will be seen that there are ten animals of the twenty-eight that failed to make the 133 pounds butter necessary to pay cost of keeping them. Four of these were mature cows and six were grade Jersey heifers. The four best cows paid a profit above cost of keep of $101. The four poorest ones, all mature cows, gave a loss below cost of keep of $31. By mixing these ten non-paying animals with the eighteen paying ones, we see that No. 1 of the list, on the basis of butter product alone gave $17 more profit than all the rest of the herd save Nos. 3 and 22.

How does this test estimate compare with the churn? The sum total of my test estimates was 4,351 pounds.

The amount of butter and cream sold together with the estimated amount, butter and cream used in the family, which was 365 pounds, differed but 25 pounds from the test estimated for the year.

I have not found this test sufficiently accurate for determining the amount of butter some cows give in a day. Three tests made from 15 pounds milk well mixed gave 72-100 of a pound each, while the churn test gave fully a pound of twice worked, unsalted butter, from the 15 pounds milk. The churn in another instance gave 1.75 pounds butter from milk which Short's test showed contained but 1.42 pounds.

The results, however, in testing a whole herd for a month or a year, tally so closely with the churn yield that these differences are of minor importance, and perhaps may be due to some error in the analysis. I believe the freshest and sweetest milk analyzes best, and the drops of acid left in the bottles from the previous analysis coagulates the milk when first put into them, and the bottles should be well washed after use. I have broken two or three bottles by allowing the water in the tank to boil, and find that a degree of heat little short of boiling answers all purposes.

WHAT WE GIRLS WANT.

By MRS. SARAH W. GETCHELL.

[Read at River Falls Institute, December 2-3.]

A Wise Man.

We have not come before you my dear farmer friends, to ask sealskin coats, with oats at seventeen cents per bushel, neither do we mourn for the ten dollar boots, when corn cannot be sold for 20 cents. When our hogs have to be marketed for three cents per pound we will not speak of silk hosery; no, not even of the gingham dresses we would like. 'Tis not the articles that money can buy that we want more than all else, though I presume the sound of "filthy lucre" would make a beautiful jingle in our ears if it only could get into the family pocket.

I have read: "A wise man, one who loves his wife, will not tell her all his business." Why? I ask. Are we not co-workers? What kind of a business firm would it be that kept each his own secret opinion, did each one his own buying and selling without a word of counsel? We are not babes; we have a right to know and be consulted, and also to counsel with our husbands in all of the business of the farm, no matter how large or small.

Two heads are often so much better than one. You may be called upon while yet in active life, while your children are to be supported, to leave the business and the farm for the land where the sheaves are all garnered and there is no thought of care.

A Business Education.

Do you stop to think how your wife, if she were unlearned in the arts of your trade, would keep the family together; she with no knowledge of the work! The land could not be sold to help her in other ways, because she who has worked a third more hours to get the home than you have has no right to sell but her paltry third. The reason that law was made was because fathers kept their daughters from becoming business women, and husbands have not helped them to broaden their education in that direction as they should have done. We hope to live to see the time, when through the justice of men, and the education of women, the wife will have full control of all property left at the death of the husband.

Girls, you need to understand your father's business, both for his sake and your own. It may keep the silver locks from fringing that dear brow if you know *just how* the money comes, and how much of it there is to be used in the family expenses. You need also to understand mother's care for her household; to take her place at times as manager, and let her go away to rest. Let the dear old hands that have labored for you, be folded in rest sometimes here. You could keep them longer with you, you know, and there will be no pang of regret when the time comes for you to take the last look on the still white face, and thoughts like these pass through your mind:

"Pale withered hand that more than four score years,
Had wrought for others, soothed the hurt of tears,
Rocked children's cradles, eased the fever's smart,
Dropped balm of love in many an aching heart;
Now, stirless, folded, like wan rose's leaves pressed
Above the snow and silence of the breast.
In mute appeal they told of labor done,
And well earned rest at set of sun;
From the worn brow the lines of care had swept,
As if an Angel's kiss the while she slept had smoothed the wrinkles quite away,
And given back the peace of childhood's day;
And on the lips the faint smile almost said,
"None know life's secrets but the happy dead."

Home-Making.

We all need to know the business of home making; then there will be no use for the one-third law. We want a free use of the family pocket-book, whether it contains much or little, to know our husband's work as well as our own.

Now, young man, don't let me hear you say: "Yes, I guess there would not be much money left if a woman had the handling of the pocket-book."

Well, it is your own fault if you choose a wife who does not know the value of money as well as you do. If you will be careful and mind these few don'ts you will be quite apt to get a wife that will be a help to you. If you go to visit the young lady at meal time, and mother gets the dinner alone, while she sits with you — don't! If mother washes the dishes while she entertains you— don't!

If the young lady wears the better clothing, and mother takes what is left— don't.

If she does not treat her own big brothers as well as she does you—don't Choose a wife who is self-denying, and be self-forgetful yourself, and there will be even pulling on the long haul of married life.

Help Each Other.

Now, big brothers, I've a word to say to you. Don't leave your sisters to the care "of whom it may concern." Your sisters are only human, and if they tire of staying at home, may accept the company of young men of whom you are not altogether proud. Oh!" I hear you say, "Two is company, three is a crowd," or, "I don't go with my own sisters when I can go with other girls." Who does more for you than your own sisters?

Think twice, boys, you are in a measure responsible for your sister's welfare. We mothers all recall the thrill of delight tempered by pain when our wee baby girls are for the first time laid within our arms, there to learn their first lesson in waiting. How tenderly we hold them until they receive the needed comfort, nor do we think to chide them if they weep.

Just so surely should our larger babies find comfort in mother's arms. When your school girls come to you with a sorrow, or the first tale of childish love or some disappointment, don't, oh! mothers, say: "Oh! go along with your silly talk, wait until you are older before you talk such things." Look backward into your own life when you were as young as they; and if you are honest you will find feelings there akin to theirs.

A Mother's Love.

Hold them tenderly, heal their sorrows yourself with your own balm of healing. Do not let them away from you to seek comfort and guidance from girls of their own age. Let us make our daughters know that mother's love is first, last and most. Then we will fill the first great want of our girls' lives. We want most of all material things, our husbands to be always our lovers, to know that the love you were so eager to express years ago, before so many cares came to bring the silver threads, and the "crow's feet" are ours yet.

If a neighbor's wife who has much more time and money to use than your wife has, does look a little more dressy, don't say to her: I do wish you would look as neat and trim as Mrs. B—. If her daily life is so full of care that there is little room left for self-culture, do not as you sit quietly reading to yourself while she is mending the torn pants, or darning the little mittens, venture to remark, that she has retrogrâded, while you think you have advanced, since your marriage.

If she cares for you, instead of the sleep and rest that should come, her mind will be full of ways for improvement, her heart will hold a great pain and there will be tears on her pillow that never should have been there.

Remember, oh! husband, your sphere is as large as the world; your wife's does not reach beyond the garden gate. Your wits are constantly sharpened by whetting against other's outside, while hers grow rusty by disuse. But of all our needs, the greatest is a trust in each other, in our children; most of all in our God. "To feel and know that we may go where ere He leads the way."

THE FUTURE FARMER AND FARM WIVES.

By Mrs. M. C. Oakey, Osceola Mills.

To the farmer of to-day in this new country, belongs the bone and sinew work of clearing and breaking the land that their children, the future farmers and farm wives, may come into possession of cultivated and fruit-bearing lands. Those here who are already in possession of such are mostly on the shady side of life's journey. And should we ask the farmer, why are you toiling away the best years of your life to get the farm in good order just as old age comes on, he will answer: It will be a home for us old folks, and when we are gone our boys and girls will have what is left; the highest and noblest aims being for the good of their children.

Yes, the farmers of to-day are building homes for the next generation, and as you work to give them a goodly inheritance, you ought to see that they have the training that would fit them to properly fill the place; that is, give them a few lessons in practical farming, the results of your experience.

The Country School.

The first lessons, almost, must be learned in the country school. While there are many things in them to be commended, there are also many things to be regretted, and many of the latter cannot be well avoided, while many more could be easily remedied. One of the greatest trials is the shortness of the terms, which, till we get better able to afford more school, cannot be well avoided, and for that reason a continued change of teachers, which, if the teacher be a good worker, is a great misfortune. But herein comes another source of ill. About half the teachers have no interest in the school other than drawing their salary and trying to dress in a manner to astonish the plain country folks. But the other half are the ones that the school board should try to secure. Teachers that are honest and wish to earn every cent that you pay them, for one of the very best lessons for a child to learn is to ask nothing when nothing is given.

A Practical Education.

It is not necessary to send the boy to college to learn something that will be useful to him on the farm. I think you could count on your fingers all the farmers that are intelligent and successful that have ever attended a college or high school, but there are many useful things that could be taught in the public school. I think a few nails and a hammer and a saw would contain a lesson whose moral would help the boys in the future repair of their farm buildings and fences. Did you know that the boys and girls would take as much pride in keeping the school houses and fences in order if you would create a sentiment in that direction as they now do in tearing down and disfiguring with their knives and pencils. I remember in one school where I taught the porch got out of repair and they had some lumber there left from a coal building and two of the boys worked every noon till they had a neat porch built, and the board told them they could build a walk to the gate, the boys wanted pay for their work and said they would if the board would get us scrapers and they did so. I made a suggestion that was followed, that a few tools be bought for the boys and I never knew a board to stay off after that, they took pride in keeping up the repairs and their parents were proud of their work. Try this and see if it will not be a saving experiment. Get some crash for one-half dozen towels, they they will be a great comfort, the girls will hem them, take them home and wash them and will learn something too, I don't doubt that some genius amongst the boys would make you a roller to hang them on, and will thus learn how to make one for his own home, and there are many useful things that a teacher whose aim is the good of the children can bring in that will give the children a respect for work and for the vocation which will probably fall to their lot.

Exalt the Farm and Speak Well of It.

But as the school hours are only from nine till four, there are the long winter evenings that the boys and girls are left to you after the chores are done and mother has sat down to knit or sew, don't forget to talk to the boys and girls about the things you have learned by experience, talk to them about your mistakes, and do not blame every failure to the farm, or say that every one is trying to swindle the farmers, for you only discourage them, and they will think that the farm is a poor place, and farmers are abused nobodies, but if you ever do get discouraged and feel that way, do not say a word to the boys, but go visit some of us that do not live on a farm and see if you are living off the fat of the land. I think we will go home more encouraged, and advise the children to stick to the farm.

We must not forget that the life is more than meat and the body more than raiment, and aside from being successful home-builders our boys and girls are going to be the society and law makers of the future and their place in society will depend much on the home training and influence. There are few of us that do not want our children to stand amongst the educated and intelligent citizens of the coming day and there are a few that are able to give them college educations. But in this day where a good paper can be had for a whole year for $1, once a week, we ought to all take at least one and talk to the boys and girls about the news, get them familiar with the workings of the government, and with manufactories and industries. It will give them a patriotic love and respect for their country. They will have such an understanding of its needs that it will not take a smooth-tongued polititian and perhaps a glass of larger beer to secure an intelligent vote from them.

Good Books and Magazines.

Good books were never so cheap as now. I have a catalogue where many of the best authors well bound can be bought for 30 cents. Get good story books for them when they are young and as they grow older they will develop a taste for good reading, just think, for three drinks of whisky (if any farmer ever does indulge in such) you could buy a book which would cause enjoyment to yourself and your entire family for a good many long evenings, and be a lasting benefit to all.

There is one thing to be careful about and that is these trashy magazines that send out chromos to catch subscribers. I do not blame you for wanting the pretty cards for the boys and girls, and I believe the love of the beautiful is their higher and better nature coming out. But go to the store and buy them the cards and for the dollar which the magazine will cost you can get the cards and two or three good books, but do not let your boys and girls waste their young lives over the hair-brained adventures of imaginary people who could never exist. It makes real life a burden to them. It is hard to peal potatoes for mother, after having been decked in diamonds and laces with Augusta Angelina. And much of a man's standing depends not only on the intellectual, but his moral make up.

Just imagine the rich man that is sordid and mean in his dealings with his fellow men. Be he ever so well educated no one ever respects the man that respects no one but himself. So do not point out the faults of the wrong-doers but emulate the good qualities of the successful ones, and make the boys and girls feel that honor and virtue will surely be rewarded.

As we are looking at the man who is lying drunk in a ditch there are few of us, although we may frequent the saloon, that would not almost rather bury our children than see them thus. And let's be honest with them and tell them the dangers of dissipation and excess in not only the saloons but other places where there is no good and much of evil. What we want most is not so much a harder working class to fill the place of the present farmer, as a class that will rise up and do justice to their parents to requite for the anxious care they have had for them.

The farmer of to-day is doing a grand and noble work for those that will come into possession of their homes after they have gone. And even though they may make some mistake in the sowing of the seed, I doubt not in God's good time, the harvest will bring forth golden fruit and our boys and girls, the future farmers and farm wives, will shine forth as the stars in the firmament.

WHAT SHALL WE READ?

By Mrs. M. McCoy.

[Read at Belleville Institute, March 18-19.]

Education and Progression.

We are told by a great philosopher that "A little learning is a dangerous thing," and to avoid the danger we must increase the knowledge.

It is of vital importance to all students, how they can best attain to a thorough knowledge of life, and acquire an education necessary for the discharge of the duties which every human being owes to each other, and the facilities now within the reach of all the inhabitants of these United States for so doing, is beyond, far beyond, anything our ancestors dreamed of. But those who from age or lack of sufficient means cannot afford, or avail themselves of those priviliges provided by the State, in our colleges have the blessed privileges of reading and studying the books, which are accessible to all so "what shall we read" is the subject under consideration this evening.

Among so great a variety of books it is very difficult to make a good selection, but as we farmers are supposed to know very little of book lore, we can choose a few of the best, which will be sufficient to enlarge our ideas of God, man, the world, and illimitable space, and to even take a peep into some of the sciences.

History.

First, let us look at history. And beyond all comparison we place the book of books (which it is presumed the inhabitants of Green county are conversant with) above all other history in point of time or authenticity, as an able writer has said: "It has God for its author, salvation for its end, and truth without any mixture of error for its matter."

And from this highly inspired pinnacle we step down to profane history. Giving age precedence we have as accessible to all readers, Rollins' Ancient History. The style in which it is written makes it most pleasant to the general reader, and is in many parts like a work of fiction for readableness.

History enlarges one's ideas of the ancient world, and we owe much to those historians, who to fit themselves for their work must travel and find out, all about what they write, about the colonies, who started them, what led those colonists from home, why the Persians came, what they believed, what countries they attacked, and of Egypt, what about its sources, rivers, soil. About their gods and their belief, that all events were under the guidance of the gods, so, we learn that there is an instinctive consciousness of a supreme being in every human breast. As every American should be interested in the history of his own county. Bancroft's history of America ought to be within the reach of all.

But to know how other nations were governed we must consult those which are notable for reliability, among which are Humes' History of England, and Gibbon's Decline of Rome. Humes' is perhaps too voluminous for the average reader, who likes to have everything condensed, as it were in a nut shell. Gibbons is very readable and reliable, but sometimes sneeringly suggestive of skepticism. Then we have an excellent history of Greece, by Grote, and of the French Revolution by Carlyle, and of the south of Germany by Yonge, but we had almost forgotten the facile Macaulay, whose History of England is so fascinating.

Biography:

We next glimpse at biography, and we must adjudge the foremost place to "Plutarch's Lives." If you want to know of the great orators, statesmen, soldiers, rulers of the ancient world, the kingdoms of Greece and Rome, by all means read "Plutarch." It is very profitable to read the "lives of great men. They remind us we can make our lives sublime," and the lives of such men as Baxter, Bunyan, Luther are a great help to stimulate spiritual life.

Then we have Boswell's Life of Johnson; Boswell, prince of biographers.

Next looms up the great prose writers of fiction of more recent times.

Scott must be awarded the post of honor. His novels, historically, cover a period of 200 years, and who near his last said he had never written a line which he would wish erased. His purity, humanity, and generosity, endeared him to all his acquaintances.

Dickens, whose works were the means of directing the attention of the "Powers that be" to the terrible state of gaols, work houses, and tenements, in fact, to everything that would ameliorate the distress consequent on poverty, and made the wealthy and selfish to see the need of reform, and caused the thinking people of London to think and act for the down-trodden, degraded habitue of the slums of his great city, his works are a benefit to the human race.

Every age has had its marked phases. The civil war in England brought out such men as Jeremy Taylor, John Milton, John Bunyan, and their work remains and will endure while the world lasts.

Luther and Melancthon were the offspring of the reformaton, and we owe much to it for the books we now enjoy.

A book to be beneficial must be a truthful delineation of the times, and must be essentially human, and we must trace the influence of Scott's works to his recognition of the sympathetic in common life. Our day has made an advance in this line, we have annals that enter into all the bearings of discipline in forming men and events, which make a true history of the times, and those who would benefit the race must be keen observers of men, and enter into their forms of life and society, and those books which live through the ages are those which connect themselves with human life and action.

Good Books, An Inspiration.

Every good wise book helps us to understand the world, or God, better. There are many who prefer sentiment to humanity, and they will meet with authors, who seeking a temporary reputation, later to their appetites, but such works are short-lived.

The beginning of the present era had many noble minds, and some, though pagan, entertained ideas far ahead of their times and a perusal of their works, though only translations, will repay the student. Books can only be profoundly influential as they unite themselves with decisive tendencies—our society has a great influence for good or bad on us. If we move in an atmosphere of good, pure books we get the very best society, needing no introduction, and can meet them at leisure unchanged and unchangeable. Such names as Bacon, Erasmus, More and others, rise in our minds as superior to the average intellect, and every age has its own typical life stamped indellibly on its institutions.

It is pre-eminently fortunate when the contributions to one's life comes from sometimes opposite and remote points, so the stream is kept fresh and full by distant yet converging tendensies.

Modern Authors.

We cannot omit our modern female authors as Hannah More, Charlotte Bronte, George Eliot, Mrs. Phelps, Mrs. Stowe, Miss Willard; but their names are legion who have battled for temperance, purity, freedom, and all that ennobles home life.

I need not name theological works, as each branch of the Christian church has its favorites in doctrine—some Armenian, others Calvinistic, and some like Mrs. Ward's Squire, who would like a Christianity without a Christ, who had men of straw created for him to knock down, a dishonest, misleading and unfair manner of debate.

Youth is so susceptible that parents should use all caution in regard to what is admitted to the home, and no questionable literature should be admitted. In reading we should use discrimination, diligence, and earnestness; we should read for facts—quality of matter is the main string. We can be at no loss in these days for variety in books. Do we want a "feast" of wit or "flow" of humor, we have only to take up Swift, or Lamb, or Wordsworth, or Goldsmith, or Irving, whose Knickerbocker, etc., is matchless for humor, and his Sketch Book unparalleled for beauty of description and pathos. Cervantes, too, whose Don Quixote served Chivalry, as did Mrs. Stowe's Uncle Tom's Cabin slavery. Then we have the immortal dreamer, whose Pilgrim's Progress, which has been translated into every European language, thrills us with a view of the Christian's course from the slough of despond to the pearly gates and golden streets of the New Jerusalem. We dare not omit the imaginative De Foe, whose immortal classic, Robinson Crusoe, considered by many as only fit for the young, and never think of reading it in mature years, yet if they did would find more religion, philosophy and political economy than in some works which bear the name. Johnson's Rasselas, and Goldsmith's Vicar of Wakefield, have long been classed among the best English classics.

Eber, Ware and others who have

written on Egypt, Greece and Syria convey through good fiction solid truths of the habits, institutions, and life of the people they portray. Books are a power at work, silent but impressive companions, and in the retirement of our rural homes have through them and a healthy press, nutritious food for our children's intellectual and moral growth.

Poems of the World.

As we desire to aim at knowing the best, we turn with pleasure to greet those who have long been adjudged as the greatest poems of the world.

First in point of time and matter Carlyle, that great thinker, but dyspeptic pessimist, places the Book of Job for sublimity and grandeur of description.

Then we name Homer's Iliad and Odyssey, Virgil's Anead wherein the boys can read of the affection Aneas bore to his aged father, by carrying him on his back out of burning Troy, though by the transaction he lost his wife.

Next comes Dante, that superb Italian poet of the thirteenth century, whose "Divine Comedia" has had cosmopolitan fame.

Tasso, also Italian, of the sixteenth century, whose "Jerusalem Delivered" has fed the soul of many a scholar, with "thoughts that breathe," and tells of his restless energy in the race after fame.

The unrivaled Shakespeare, whose knowledge of human nature was unbounded.

Then Pollock's "Course of Time" which was dear to many of the past generation.

Young and Thompson are still read with pleasure. Byron's "Childe Harold" and Moore's "Lalla Rook;" Gray, especially his "Elegy;" Bryant, Longfellow, Tennyson, Burns, all these are good poets, but none of them will give the boys more pleasure than Scott's "Marmion" and "Lady of the Lake."

Books of Travel.

In travels we can scarcely make a selection. There are so many well written descriptions of foreign lands, and so felicitous in style that the most exacting taste must be satisfied.

"Views Afoot," by Bayard Taylor is very interesting; but we have exceeded our limits, and yet only mentioned a few of the many that might be read with profit, and to sum up all, if you will own a good encyclopedia, a Webster's unabridged, a family Bible containing a Smith's dictionary, Young's concordance and the many tables chronological and informatory on different subjects, you will be well instructed in all matters of essential importance, and you will have no time or desire for yellow-backed literature.

THE BUSINESS FARMER.

BY C. W. STAPLES.

[Read at Osceola Mills Institune, Nov. 26, 1899.]

Looking Upward and Onward.

In speaking on a subject of which you know but little about, it is much easier to criticize than it is to advise, hence I will attempt to criticise the average farmer for not earning and wearing the title of this essay, and perchance throw in a little advice on the side.

There seems to be enough advice afloat from good and reliable sources, but there also seems to be a backwardness toward accepting anything but those old tried methods, that have proved good in their day, but are entirely inadequate to the needs of the modern business man, and right here seems a slight mistake, the farmer is not generally known as a business man, the term does not seem to apply to him; and no doubt you noticed that it sounded somewhat far-fetched in the former sentence. We say that a person is a good business man when he not only accepts and tries new approved plans and methods, but throws his individuality into his business, and conducts it in a little different manner than his competitor, he buys as cheap as he can and sells as cheap as he can afford, in fact he tries to undersell his neighbor. How often do you hear of a farmer trying to undersell his neighbor? His word is as good as a bank note and his advice and influence is respected in the whole community. Such a man, we call a good business man, and when a farmer (and there are many such) conducts his farm in a similar manner, he, too, becomes a good business man and usually a successful one. The farmer is to blame for this distinction between men engaged in mercantile pursuits and those engaged in tilling the soil. The difference is only imaginary, and the only way to remedy the imagination is by not only "looking backward," but by looking upward and onward, in earning the title and wearing it with professional pride.

"Who's to Blame?"

I have known farmers to spend more money for books, papers and periodicals each year than they did for tobacco, cigars and whiskey. How many do you know that do the same thing? Not many. Then "who's to blame?" if the farmer is not generally known as a good business man.

A judicious investment in this line will bring you in far greater returns than you may at first suspect. No man can make a success at anything now-a-days unless he invests in printer's ink, and the amount of work accomplished in his toil will be far greater for the moments spent in papers devoted to farm work. The household work will be far lighter if the magazine makes its weekly visits in the library, and the chores make light work for glad young hearts when the round table is replenished with fresh and wholesome reading matter every few days.

I have also known of a farmer who sends his boy, a good, strong lad of sixteen summers, into the field to work along side of the hired man, and expected that the boy would perform as much work for his board and clothes as the hired man did for one dollar a day; and then when the day was done, the boy must do considerable more than his share of the chores and run on errands about the place until long after bedtime. Oh, what a blessed privilege it is to be *such* a boy on *such* a farm.

Mothers and daughters, also, do the work incident to the household, taking care of the yard and garden, for their board and clothes, while at threshing time father hires a neighbor's girl and pays her seventy-five cents for doing about half the work the daughter does every day in the year. No wonder the life of the farmer's daughter has been praised in song and verse, and that the beautiful girl clings so tenaciously to the old homestead. Don't make such a mistake; pay the boys and girls for their work; pay them according to their worth; pay them promptly as you agree, and let them do as they choose with their earnings. More farmers' sons would succeed the father in business and farmers' daughters would be better satisfied with their lot as farmers' wives, if the latter plan be adopted.

Impractical and Unremunerative Methods.

There is but little reason, justice or judgment in the present system of educating the boys to succeed as on the farm; and the failure of the system is shown by the number of boys who are anxious for anything but the farm, and the girls are also dissatisfied with the farm as a home.

I have known farmers who never paid the land for the crop it gives them year after year; they took off all they could get, but never put a cent's worth back in the way of fertilizers, and then even wondered why they don't raise as much wheat or potatoes on an acre as they used to, when the greaest and only wonder is, that they can get anything off of land that has labored so long for not even board and clothes, we might as soon expect our land to give us a crop without proper fertilizing, as we would our binder would cut our harvest without oil; one is as essential as the other. If you haven't enough manure to properly keep up the farm, and the crop does not warrant buying, then sell a piece of land and buy stock with the proceeds, and thus make the supply equal to the demand. You may steal ten dollars from the land in the spring but it will cost you twenty dollars by fall, and is far better to be honest and pay for what you get in this line as well as any other.

I have actually seen farmers who didn't have time to clean up their door-yard, fix up a piece of lawn or set out a few shrubs and shade trees; but they *did* have time to go to the village every day or two to play a game of cinch at the corner saloon, or gossip with the horse-trader an hour down the lane.

Does a business man think he can do business in a slovenly, dirty shop? If so he fails and finds out that his customers have gone over to John Wideawake, a progressive and thoughtful competitor.

The Usual Surroundings.

Poor fences, a littered door-yard, no trees or flowers, the little scraggy wood-pile lying at loose ends about the place, all betoken shiftlessness, laziness and illiteracy. Hang out a better sign if you would be classed with business men. A good business man never misses a chance to better his trade or condition by the experience of others, he studies closely the trade journals, and the new methods of advertising; he attends the conventions and belongs to the associations that are held for the benefit of his trade. But how is it with the average farmer, he rarely attends and takes but little interest in the county fair, but leaves the horse jockey to manipulate the management to his advantage, he has no time for the farmers' club, but leaves the routine work of that and preparing for the institute to a few enthusiastic villagers who have no direct interest therein. What other class of business men, when meetings are gotten up for their benefit would allow another profession to come in and transact the business of the meetings? Surely we know of no other, but it is a common thing all over our land to see agricultural associations and farmers' clubs, managed by those outside the farm.

I have known a business man—no, a farmer, who had a thousand dollars' worth of machinery exposed to the weather, hunt an hour for a twenty-five cent jack-knife that he had lost.

Now, this is not an absurd comparison, but a true one, and if he had worked that hour putting up a shelter for the thousand dollars' worth of machinery, he could have bought him a bran new one dollar and a quarter knife with his savings.

I have known farmers who claimed that they are too poor to provide shelter for their cattle, and so let them run to the straw stack for fodder, seek shelter on the shady side of a barb-wire fence, and drink ice water to quench their thirst, during our cold and severe winters; by a little fore-thought and the farmers' journal, they can see that shelter and warm water costs nothing, comparatively, except a little labor; that to keep stock warm saves 15 to 20 per cent. of the fodder, and that it is unnecessary for cattle to run out for exercise in this cold climate. The increase in the value of the herd could be directly traced to the farm journal or the Farmrs' Institute, which give us theory and experience far cheaper than we can get it ourselves.

Intelligence and Application Bring Success

There is no business that will succeed when the manager does not put all his time, energy and thought into it every day counting three hundred and sixty-five days to the year.

No business will thrive when the manager is continually telling that it does not pay—that he is running behind—that he is heartily sick of his business—and wishes he could find something else to do. A man must like his calling before he can expect any valuable returns therefrom; and those who are lukewarm to their own interests, will find it far more congenial if they would take off their coat occasionally and help sustain the county fair, the farmers' club, the institute work or any other means by which the farmer may gain knowledge without the slow, tedious and sometimes expensive, "actual experience." Every business farmer should be progressive and alive to the needs of his profession, and to the demand of the times; by so doing he can bring up the standard of the farmer, and be able to wear with distinction and pride, the title of o good business man.

IMPROVING SANDY LANDS.

By W. R. Barnes.

[Read at Friendship Institute, January 21-23.]

Push, Clover, Fertility—Success.

When we purchased the land on which our homestead stands, which is a sandy soil, or clear sand as most folks would call it, the part which was under cultivation was so exhausted with poor farming that many people thought it utterly worthless, and when, in the second year, we put up a large barn, 36x45 feet, our neighbors laughed and wanted to know what we were going to put in it. We told them that we would fill it with black oak brush if we could find nothing better.

Knowing but very little about a poor, sandy soil, coming as we did from the rich, black soil of Racine county, we had but one thought, and that was that the success or failure of a man was in the style of farming he practiced, and I am still of the same opinion. A man cannot make a success of farming. either on clay or sand, and be half of his time sitting on a dry goods box smoking cigars and drinking beer, unless he has more brains than the most of folks. Common sense taught us that we could not get something out of nothing; but we firmly believe that such land could be made productive by putting on manure, sowing buckwheat or rye and turning it under when green, sowing clover, and following with a thorough rotation of crops. The result has been that the land under our system of farming has been gradually improving during the seventeen years we have been upon it, and the yield per acre as great or even greater than upon any clay farm with which I am acquainted. Our potatoes this year yielded 415 bushels to the acre; our corn 170 baskets per acre; barley 50 bushels per acre; oats 60 to 80 bushels per acre; clover, medium, 4 bushels, and mammoth 5 bushels of seed per acre, and sorghum syrup at the rate of 200 gallons per acre.

Conserving Fertility.

Looking forward to clover as the principal agent in improving the soil we had first to do something to make the clover grow. For this purpose we plow deep, and sowed buckwheat early, and then turned that under when in full bloom. Plowing under old hay or starw or rye when green would answer the same purpose. Then we sowed clover and got a fair start in the way of improvement.

Mammoth clover is much the best kind for restoring fertility to exhausted soils, and great care should be taken not to sow too much seed. Having the largest kind of clover, and so thin on the ground that each plant has room to do its best, then the roots are large and penetrate to a great depth, finding plant food at a far greater depth than it reached by any other crop and bringing it to the surface. Then when that clover is plowed under the top soil is enriched with all the best elements of plant food without the disadvantages of a clay soil.

One of the best materials for enriching sandy land is fresh coarse barnyard manure, when you have plenty of it, the coarser and greener the better it is, as it takes more time for it to rot and leach away, also holding the moisture and making the land less liable to dry and burn with the heat of summer. If you put well-rotted manure on sandy land you need not expect much benefit from it as it will all be used up the first year so do not leave your manure to lie a year or two in your barnyard, but clean them out every spring and every fall, and give your land, and not your barnyard, the benefit of it. And mind, you spread yonr manure as you haul it, so that every part of the land receives equal benefit. It pains me to see a man waste his strength, waste his manure and spoil his land by leaving his manure in piles three or four months. There will be a patch about four feet sqnare where the crop will fall down and rot, and the best of the ground will look as if no manure had been spread on the field.

But as the quantity of manure on the farm is always limited, clover comes in as the farmer's best friend, on which he must place his chief reliance for enriching his soil, and it is equally adapted for both clay and sandy soils. It possesses the most nutritive properties for the feeding of stock. By growing it you can keep more cows, horses and hogs, all yielding present profit and making an abundance of manure for the future, and when you plow it under, the rotting of the whole plant, including the roots, makes the soil in the best possible condition for every kind of crop.

Clover, Hogs and Dairying.

As farmers here are turning more of their attention to dairying since we had such a prosperous and well conducted cheese factory in this village, they will find clover the very best pasture for producing the largest amount as well as the best quality of milk, and it is also the best pasture for the hog, we may assert that it is, on the whole, the most profitable crop on the farm.

Our sandy soils should be kept in a good state of cultivation from the start.

For this purpose have a regular rotation of crops. When clover sod is broken up it should be followed by a clean, hoed crop and then seeded down again with clover along with the following crop of small grain:

On exhausted, sandy soils the firs start in improvement is the most difficult. As I said before, put on all the manure you can scrape up, sow buckwheat or rye and plow under when in full bloom; and to still further insure a good stand of clover, sow equal parts of salt and land plaster, 100 pounds of each to the acre at the time of seeding the clover.

Before plowing up a clover sod cover it well with manure, either in the fall or early spring, and leave it as long as possible before plowing, so that the clover gets a good start, and you have quite a crop of green clover to turn under. This causes quick fermentation and decomposition of the whole clover plant—roots and top—and gives the corn or potatoes an early start and a vigorous growth; then let the cultivator and hoe be freely used, allowing no weeds to grow, and you are pretty sure of a good crop, whatever the season may be. Follow the next year with wheat, oats or barley, seeding down again with clover.

I consider clover seed a profitable crop to raise on sandy land, as the few bushels of seed you get takes almost nothing from the soil, and the rotting of the straw and the roots of the clover add an immense amount of fertility to the soil. I would, in conclusion, say to the tillers of sandy farms—Don't get discouraged, but go at it with a will to win; put on your manure, sow on your clover, and attend well to the growing crop, and I have no fear of your success.

BREEDERS' DIRECTORY.

Catalogues and Prices of Stock will be Furnished upon Appication
Write for Information.

ARNOLD, A. A.—
GALESVILLE, WIS.

Short-horn Cattle and Berkshire Pigs.

ARNOLD, LEVI—
PLAINWELL, MICH.

Jersey Cattle (A. J. C. C. H. R.), Registered Merino Sheep and Poland China Swine.

ADAMS, H. C.—
MADISON, WIS.

West Lawn Herd A. J. C. C. Jerseys. Pure St. Lambert bull at the head of the herd, St. Lambert, Alphea and Omaha blood finely represented.

BOYDEN, W. E.—
DELHI MILLS, MICH.

Short-horn Cattle, Merino Sheep and Poland China Swine. "The best is none too good."

CLELLAND, C. S.—
JANESVILLE, WIS.

American Merino Sheep.

CHERRY PARK CO.—
CHESHIRE, CONN.

Cattle Club Special, Gold Medal Jersey Herd for four years. Premier Albert (five lines to Albert 44); Happy Welcome, No. 15388 (1,000 tested cows represented in pedigree.)

CONVERSE, S. A.—
CRESCO, IOWA.

Importer and breeder of Red Polled Cattle.

CONVEY, THOMAS—
RIDGEWAY, WIS.

Poland China Swine and Plymouth Rock Fowls.

CASS, JAMES D.—
BELOIT, WIS.

Shropshire Sheep, Poland China Swine and Fancy Poultry.

COE & CONVERSE—
FT. ATKINSON, WIS.

General Nursery Stock.

DURAND, H. S.—
RACINE, WIS.

Jersey Cattle. "St. Lambert," "Stoke Pogis," "Belle of Scituate," etc. All registered in A. J. C. C. H. R.

DUNHAM, M. W.—
WAYNE, ILL.

Percheron and French Coach Horses.

DILLON STOCK FARM—
STERLING, ILL.

Breeder of Aberdeen Angus and Red Polled Cattle, Trotting Horses, Shetland Ponies, Berkshire and Poland China Swine.

EDWARDS, J. M. & SON—
FT. ATKINSON, WIS.

General Nursery Stock.

FOX, A. O.—
OREGON, WIS.

Standard-bred Trotting Horses, French Coach Horses, Short-horn Cattle, Shetland Ponies, Poland China Swine and Shropshire Down Sheep.

FOX, DR. PHILIP—
MADISON, WIS.

Standard-bred Trotting Horses and Shropshire Down Sheep.

GERRISH, ALLEN—
ST. CHARLES, MINN.

Duroc Jersey Swine, Pekin Ducks, Rose Comb Brown Leghorn Fowls. Send stamp for "Breeders' Memorandum;" worth $1.

HYATT, A. X.—
SHEBOYGAN FALLS, WIS.

Breeder of Dairy Cows, for revenue only. The milk pail, the cheese vat and finally the number of pounds of butter decides the cow for profit.

HIRSCHINGER, CHAS.—
BARABOO, WIS.

Registered Devon Cattle and grower of general assortment of Nursery Stock.

HUMPHREY, C. W.—
CASCADE P. O., WIS.

Everett's New Golden Cross Wheat (Winter), $2 a bushel, or two bushels in new grain sacks $4.

HERDMAN, WM., & SON—
RIX'S MILLS, O.

Black Top Spanish Merino Sheep. Delaine wool a specialty.

HILL, CHAS. E.—
DENVER, COL.

Rocky Mountain Herd A. J. C. C. Jerseys. "St. Lambert" blood a specialty.

HOPKINS, WILLIS W.—
ALDENVILLE, WAYNE CO., PA.

Breeder and shipper of choice Ayrshire Cattle.

HACKER, T. L.—
MADISON, WIS.

Jersey and Guernsey Cattle.

INMAN, T. H.—
HANOVER, WIS.

Breeder of Thoroughbred Brown Swiss Cattle. Noted for their fine milking qualities.

JONES, E. W.—
YOUNGSTOWN, ILL.

Poland China Hogs carefully bred.

JACOBS, W. H.—
MADISON, WIS.

Short-horn Cattle and Berkshire Pigs.

KISER, J. C.—
OREGON, WIS.

Short-horn Cattle.

KIRKPATRICK, J. C.—
REWEY, WIS.

Standard-bred Trotting Horses and Large Carriage Horses, Galloway Cattle and Pea Fowls.

LOUIS, THEODORE—
LOUISVILLE, WIS.

Poland China Pigs.

LAWRENCE, CHAS.—
DANVILLE, WIS.

Short-horn Cattle, Poland China Hogs and Shropshire Sheep.

LESLIE & BURWELL—
COTTAGE GROVE, WIS.

Aberdeen-Angus Cattle.

LEHMANN, MRS. A. W.—
NEOSHO, WIS.

M. B. Turkeys, Pekin Ducks, Toulouse Geese, Plymouth Rocks, Wyandottes, Partridge Cochins and Choice Strains of Poultry.

MITCHELL, JOHN L.—
MILWAUKEE, WIS.

Standard-bred Trotting Horses and Registered Jersey Cattle.

McKERROW, GEO.—
SUSSEX, WIS.

Oxford, Shropshire and Southdown Sheep, Chester Hogs and Bronze Turkeys.

MOREHOUSE, H.—
SEDLEY, IND.

Breeder of Registered Guernsey Cattle.

MORTON, L. P., PROP'R,
J. L. HOPE, SUP'T—
ELLERSLIE STOCK FARM, RHINECLIFF, N.Y.

Guernsey Cattle and Southdown Sheep.

MORGAN HORSE CO.—
DUNDEE, ILL.

Breeders and dealers in Morgan Horses. Send for a catalogue.

MULROY, P.—
HORTONVILLE, WIS.

Holstein Cattle, Lincoln Sheep and Poland China Swine.

MARSHALL, WM. G.—
IOWA CITY, IOWA.

Breeder of Poland China Hogs.

MORROW, DR. WM., & SON—
NASHVILLE, TENN.

Jersey Cattle. See advertisement.

NASH, L. M.—
CENTRALIA, WIS.

Short-horn Cattle, Cotswold Sheep, Victoria and Poland China Swine, Golden Bronze Turkeys and Plymouth Rock Chickens.

PALMER, N. N., & SON—
BRODHEAD, WIS.

Registered Jersey Cattle and Berkshire Pigs and Plymouth Rock Fowls.

PACE, WILLIAM—
BICKNELL, IND.

Chester White Swine, Fancy Poultry and Fox Hounds.

PABST, FRED—
MILWAUKEE, WIS.

Percheron Horses.

PERRY, ELI—
WAUPUN, WIS.

English Shire, Suffolk Punch and Hambletonian Horses. A fine selection of draft stallions.

ROSENKRAUS, O. L.—
OCONOMOWOC, WIS.

"Hawthorne," son of Black Arthur, the best son of Altitude, son of Almont. This stallion has no superior in Wisconsin. Send for circular.

REID BROS.—
JANESVILLE, WIS.

Clydesdales, English Shires, Hackney Horses and Shetland Ponies. Write for free catalogue.

RICHEY, R. H.—
BICKNELL, IND.

Knox Herd of Poland China Hogs. Stock recorded in C. P. C. R.

ROSS, L. F.—
IOWA CITY, IOWA.

Importer and breeder of Red Polled Cattle. Come and see stock, or send for catalogue.

SHERLEY, JOHN C.—
ANCHORAGE, KY.

Breeder of A. J. C. C. Jerseys of Signal, Stoke Pogis, Comassee and Landseer Fancy Strains.

SHARPLESS, THOS.— WEST CHESTER, PA.

Registered Chester White Swine and Grade Guernsey Calves.

SPRINGER BROS.— SPRINGFIELD, ILL.

Berkshire Pigs. Windsor Castle, Manchester Lass, Hood, Sallie and other leading families, bred at "Haw Hill." Write for free catalogue.

SCHROEDER, GUSTAVE— GRAFTON, WIS.

Victoria Swine. The best at reasonable prices.

STEELE, WM.— IONIA, MICH.

Short-horn, Hereford and Jersey Cattle, Clydesdale and Percheron Horses, Shropshire and Cotswold Sheep.

SHAFER, J. R. & W. A.— MIDDLETOWN, OHIO.

Importers and Breeeers of Oxford Down Sheep. A fine lithograph for four cents postage.

TRATT, F. W.— WHITEWATER, WIS.

Breeder of Guernsey Cattle. Young stock of both sexes for sale. Stock guaranteed as represented.

TRUE, J. M.— BARABOO, WIS.

High Grade Percherons, Jersey Cattle, Poland China Pigs and South Down Sheep.

UIHLIEN BROS.— MILWAUKEE, WIS.

Trotting Stallions.

UNDERWOOD, H.— BEAVER DAM, WIS.

Jersey Cattle, Poland China Hogs, M. B. Turkeys, Toulouse Geese and Plymouth Rock Fowls.

URQUHART, JOHN— RIO, WIS.

Holstein-Friesian Cattle.

WATKINS STOCK FARM— BIRMINGHAM, MICH.

Shetland Ponies, Exmoor Ponies, Jersey Cattle, Poland China and Small Yorkshire Swine, and Pure-bred Poultry.
G. A. WATKINS, 48 McGraw B'l'd'g, DETROIT, MICH.

WARREN, GEO., & SONS— FOX LAKE, WIS.

Trotting-bred Roadsters and Cleveland Bays.

WALBRIDGE, G. J.— COLBY, WIS.

Clydesdale Horses and Jersey Cattle.

WYLIE, GEO.— LEEDS, WIS.

Short-horn Cattle and Poland China Pigs.

BUYERS' GUIDE.

Write for Illustrated Catalogue.

BEMENT, E., & SONS—
LANSING, MICH.

Spring-tooth Harrows, Walking Plows, Steel Shapes, Bob-Sleds, Garden Cultivators and Stoves.

BELLE CITY M'F'G CO.—
RACINE, WIS.

Ensilage and Fodder Cutters, Horse Powers (both tread and sweep), Horse Hay Forks, Root Cutters, Barrel Carts, Cultivators and Harrows, Feed Mills, Hay Forks, Wagon Brakes, Wood Saws and Mangles.

CROSS, J. A.—
FULTONVILLE, N. Y.

Carriers for Farm, Mill, Factory, Coal Ice-House and other uses, Ensilage Buckets, Post, Floor and other Pulleys.

DEDERICK, P. K., & CO.—
ALBANY, N. Y.

Baling Presses of all kinds, Agricultural Engines, Hoisting Engines, Railway or Tread Powers and Wood Sawing Machines.

FLEMING M'F'G CO.—
CONNERSVILLE, IND.

Carriages — Send for Catalogue.

FULLER & JOHNSON M'F'G CO.—
MADISON, WIS.

Walking Plows, Sulky Plows, Gang Plows, Cultivators, Hay Rakes, Mowers, Corn Planters, Check Rowers, Tobacco Transplanters, Harrows, Listers.

GENESSEE VALLEY M'F'G CO.—
MT. MORRIS, N. Y.

The Missouri Grain and Fertilizer Drill and Shoe Drill, The Little Tiger Fanning Mill, Parson's Pat. Triplet Field Roller, Fargo's "V" Shaped Steel Tooth Harrow, Genesee Corn Sheller and Bodine Turbine Water Wheel.

HAUCK & COMSTOCK—
MECHANICSBURG, PA.

Horse Tread Powers, Saw Mills and Lion Fodder Cutter and Crusher.

HEERNER & SONS—
LANSDALE, PA.

Manufacturers of their Patent Level Tread Power with Speed Regulator, Little Giant Threshing and Cleaning Machine with Patent Revolving Apron, Ensilage and Fodder Cutter with Masticator, Farm Feed Mills, Wood Sawing Machines and Corn Shellers.

JOHNSON & FIELD—
RACINE, WIS.

Fanning Mills and Land Rollers.

KEYSTONE M'F'G CO.—
STERLING, ILL.

Disc Harrows, Seeders, Corn Planters, Corn Drills, Ensilage Drills, Check Rowers, Disc Cultivators, Hay Rakes (sulky and side delivery), Hay Loaders, Corn Harvesters, Corn Huskers, Feed Cutters, Corn Shellers, Horse Powers.

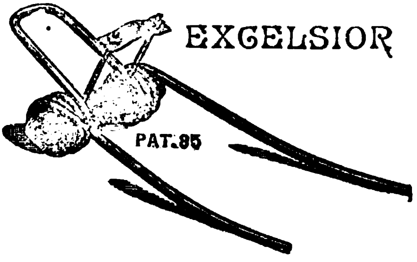
QUINCY METAL WHEEL CO.—
QUINCY, ILL.

Metal Wheels for Farm Wagons.

ROOT, A. J.—
MEDINA, OHIO.

Bee-Hives and General Supplies for bee-culture.

STONE, P. B.—
WAVERLY, PA.



The Excelsior Spring Tongue Support.

THE GEISER M'F'G CO.—
WAYNESBORO, PA.

Steam Gang Planing Outfits, Grain Threshers and Separators, Saw Mills, Portable Engines, Upright Engines, Traction Engines, Stationary Engines, Steam Boilers and Horse Powers.

THE VANDERGRIFT M'F'G CO.—
JAMESTOWN, N. Y.

New Improved Western Washing Machine, American Hand Planter, Self-Weighing Shot Case.

THE H. C. STAVER M'F'G CO.—
CHICAGO, ILL.

Cutaway Disk Harrows, Horse and Tread Powers, Feed Grinders, Tank Heaters, Feed and Ensilage Cutters.

UNIVERSAL WEEDER CO.— NORTH WEARE, N. H.

Breed's Universal Weeder.

U. S. WIND ENGINE AND PUMP CO.— BATAVIA, ILL.

Wind Mills, Pumps, Tanks, Hay Tools, Feed Mills, Corn Shellers, Feed Cutters, Saws, Tank Heaters, etc., etc.

WINCHESTER & PARTRIDGE M'F'G CO.— WHITEWATER, WIS.

Mowers, Corn Drills, Feed Grinders, Wind Mills, Water Tanks and Churns.

WARDER, BUSHNELL & GLESSNER CO.— CHICAGO, ILL.

Champion Binders and Mowers.

WILMS, P. H.— HOLLAND, MICH.

The Champion Spring Tooth Harrows and Wheel Cultivators.

WINSHIP M'F'G CO.— RACINE, WIS.

Wind Mills, Pumps (iron and wood), Wooden Tanks and Cisterns, Water Tank Heaters, Creamery Tubs, Washing Machines, Hand Corn Planters.

RAILWAYS AND MILEAGE IN WISCONSIN, DEC. 31, 1889.

Lines of the Chicago, Milwaukee & St. Paul R'y	1,310.09
Lines of the Chicago & Northwestern R'y	946.55
Lines of the Wisconsin Central Associated Lines	641.47
Lines of the Milwaukee, Lake Shore & Western R'y	571.57
Lines of the Chi., St. Paul, Minneapolis & Omaha R'y	553.86
Lines of the Minneapolis, St. Paul & Sault Ste. Marie R'y	266.85
Lines of the Milwaukee & Northern R'y	254.50
Lines of the Chicago, Burlington & Northern R. R	230.50
Lines of the Green Bay, Winona & St. Paul	221.80
Lines of the Illinois Central R. R	91.31
Lines of the Northern Pacific	84.30
Lines of the Duluth, South Shore & Atlantic	67.98
Lines of the Sault Ste. Marie & Southwestern	26.88
Lines of the Milwaukee, Dexterville & Northern R. R	25.40
Lines of the Eastern Railway Company of Minnesota	20.70
Lines of the Wisconsin, Pittsville & Superior	20.29
Lines of the Chicago, Fairchild & Eau Claire River	16.00
Lines of the Milwaukee, Menominee Falls & Western	14.60
Lines of the St. Cloud, Grantsburg & Ashland	12.00
Lines of the Menomonie R'y	5.02
Lines of the Goodyear, Neillsville & Northern R'y	5.00
Lines of the Duluth Short Line R'y	1.94
Lines of the Prairie du Chien & McGregor	1.75
Total mileage	5,390.36

WISCONSIN AGRICULTURAL RESOURCES

SIXTY-EIGHT COUNTIES.

No. of farms			141,675
Acres of improved land			8,115,333
Acres of unimproved land			4,583,715
Acres of wood land			3,660,198
Value of farms			$415,000,000
Value of farm implements			$15,997,989
No. of swine	1,596,200;	valued at	$5,102,376
No. of cattle and calves	1,843.899;	valued at	$28,062.598
No. of sheep and lambs	1,429,137;	valued at	$2,353,015
No. horses and mules	498,132;	valued at	$41,049.563
No. of cows	700,000;	valued at	$15.237,468
Pounds of butter	50,000,000;	valued at	$7,500,000
Pounds of cheese	45,000,000;	valued at	$4,000,000
Bushels of wheat	12,683,983		
Bushels of corn	38,058,857		
Bushels of oats	48,293,415		
Bushels of barley	15,502,443		
Bushels of rye	5,049,784		
Bushels of potatoes	13,492,108		
Bushels of apples	1,903,699		
Bushels of cranberries	289,145		
Bushels of strawberries	76,975		
Bushels of clover seed	61,371		
Bushels of timothy seed	101,960		
Value of agricultural products annually			**$135,000,000**
Value of manufactured products annually			**$200,000,000**

WISCONSIN PUBLIC SCHOOL STATISTICS.

ADMINISTRATIVE.

1 State Superintendent.
42 City Superintendents.
70 County Superintendents.
43 Boards of Education.
6,104 School District Boards.
1 Board of Regents of the State University.
1 Board of Regents of Normal Schools.

SCHOOLS.

University of Wisconsin and Agricultural College.
5 State Normal Schools.
165 Free High Schools.
817 Graded Schools.
5,931 Ungraded Schools.

RESOURCES.

Annual Income of		
State school fund		$193,820.70
University fund		15,241.35
Agricultural college fund		14,512.26
Normal school fund		85,364.58
State Tax for		
Common schools		$577,092.82
Free high schools		50,000.00
State university		71,653.76
Productive Fund of the		
University of Wisconsin		$187,948.32
Agricultural college		229,660.00
Taxes by counties, cities and districts		3,559,666.39
Value of school property in the state		8,898,603.00
Number of persons of school age (4 to 20)	577,123	
Number of teachers required	8,218	
Number of Teachers' Institutes held (in 67 counties)	91	
State tax for Teachers' Institutes		2,000.00
Productive fund of normal schools		1,473,243.55

Farmers of Wisconsin

SEND FOR A FREE SAMPLE COPY OF

The Ohio Farmer,

The most fearless and consistent advocate of the farmers' rights and interests in the United States. It is a 16-page WEEKLY, printed on tinted book paper; has been established 43 years, and is the

FARMER'S TRUE FRIEND

Under any and all circumstances. As a special offer it will be sent every week after SEPTEMBER 1st TO JANUARY 1st, 1891, for

ONLY 25 CENTS.

No back numbers will be furnished, so all should send in early to secure as many papers as possible.

Regular Subscription Price, $1 per Year.

Agents wanted, to whom we pay liberal cash commissions.

ADDRESS,

THE OHIO FARMER,
CLEVELAND, OHIO.

WOODSIDE FLOCK

—— OF ——

SHROPSHIRES.

The Shropshires are the hardiest of all mutton breeds—they are wonderfully prolific. The first cross on a common flock of ewes will increase the number of lambs over 30 per cent.

The Shropshires grow a close, compact protecting coat of the highest priced medium wool, of which the manufacturers of the United States import over thirty million pounds annually at a duty of over 40 per cent.

Woodside Flock has been carefully selected from among the best flocks in England and Scotland. They are large, blocky, built with heavy bodies near the ground. They are beautifully covered over the bodies, heads, faces and legs with fine, close even fleeces. As an indication of the superior breeding qualities of this flock, I will say that in spring of 1890 the ewes had one hundred and fifty-six per cent. of strong live lambs at foot when turned out to grass.

Choice stock, all ages, both sexes, at prices lower than to be found elsewhere for stock of equally high pedigree and quality.

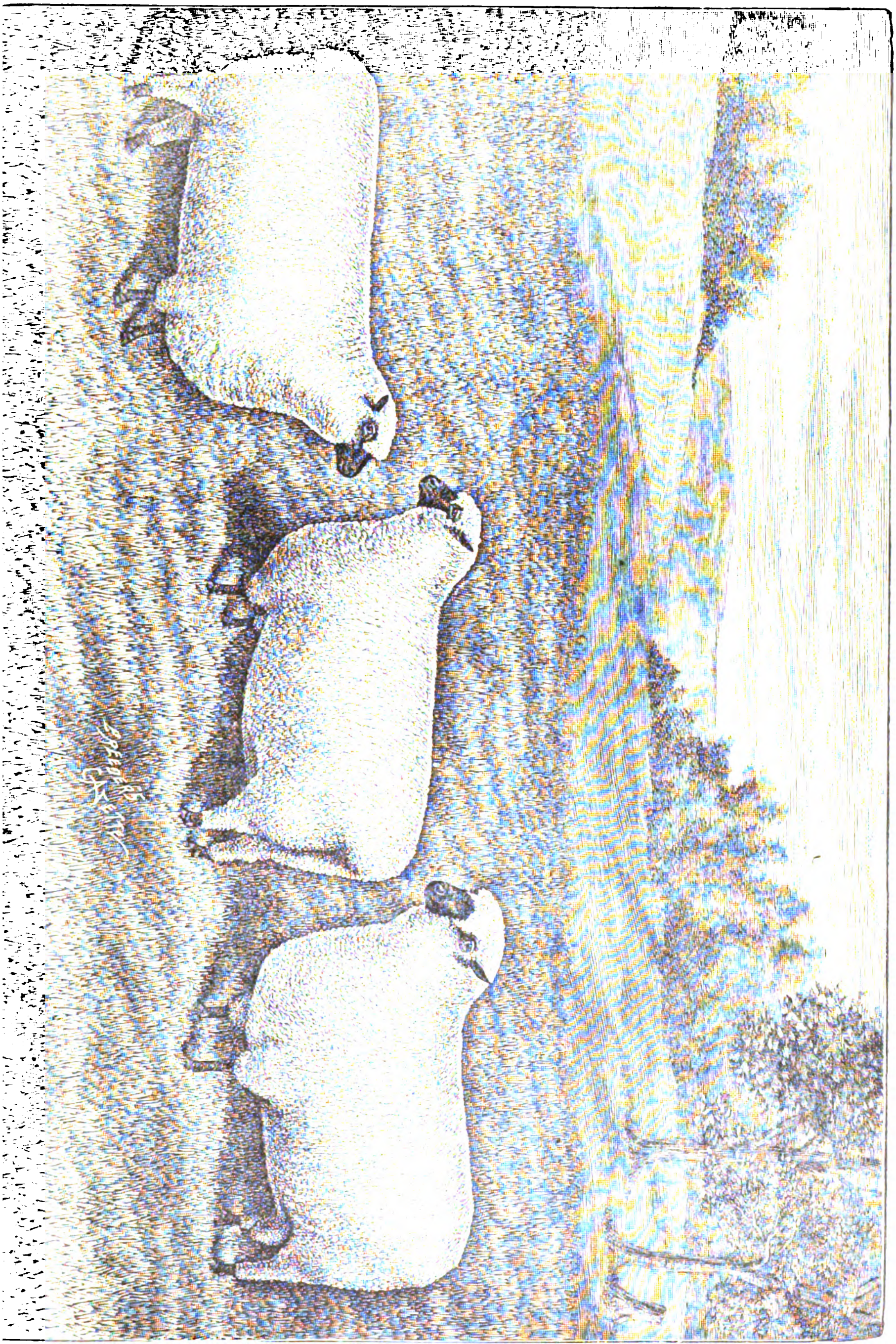
A full registered pedigree and certificate of transfer furnished free with every sheep. Stock crated, supplied with feed and delivered at Oregon Station, free of extra charge. Special reduced shipping rates for all my customers. Send for catalogue.

Correspondence solicited.

A. O. FOX,

OREGON, Dane Co., Wis.

"WOODSIDE FARM."



SHROPSHIRES from WOODSIDE FLOCK.
PRORERTY OF A. O. FOX, OREGON, DANE COUNTY, WIS.

Woodside Stud

OF

FRENCH COACH HORSES

Will always be found to contain a choice selection of young stallions from the best breeding establishments of France. They are all bought when colts and are matured and acclimated on our farm, so that the buyer has all the good there is in them. They run at large in paddocks and are kept in plain flesh.

HIGH QUALITY, Rather than Numbers, is **OUR MOTTO**

IN **WOODSIDE STUD** ARE THE

First Prize and Second Prize Winners in the Four Year old Stallion Class at the Great Horse Show of 1888.

At the Minnesota State Fair, held at St. Paul, September, 1889, WOODSIDE STUD won 1st and 2d prizes on stallions 4 years old; 1st and 2d on stallions 3 years old; 1st on stallion 2 years old; 1st on stallion 1 year old; also grand sweepstakes for the best Coach Horse, any age.

At the Wisconsin State Fair, WOODSIDE STUD also won 1st and 2d prizes on 4-year old stallions; 1st prize on stallions 3 years old; 1st prize on stallions 2 years old; 1st prize on stallions 1 year old.

WOODSIDE COACHERS ARE OF LARGE SIZE,

Weighing 1300 to 1500 lbs. at 4 Years Old.

WITH PLENTY OF CLEAN, FLAT BONE, SOLID COLORS, AND THE BEST OF STYLE AND ACTION.

PRICES LOW, TERMS EASY.

Special inducements for neighboring farmers to club together and buy on long time.

Every Animal Guaranteed a Breeder.

Corespondence Solicited. Send for Catalogue.

A. O. FOX, Oregon, Dane Co., Wis.

"WOODSIDE FARM."

French Coach Stallion GODFREY (152), 16½ hands high, weight 1500 pounds.

PROPERTY OF A. O. FOX, WOODSIDE FARM, OREGON, WIS.

WOODSIDE STUD

Of Large, Stylish, Standard-Bred

Trotting Horses,

Comprising the Choicest Families, notably,

GEO. WILKES, ALMONT, PILOT, JR., MAMBRINO PATCHEN, AND CLAY PILOT AND HILL'S VT. BLACK HAWK.

Our great aim is size and style, backed by rich, standard inheritance. Size ranging from 15 1-2 to 16 1-4 hands; weight from 1,200 to 1,300 pounds.

Stallions, Stud Colts, Fillies, Brood Mares,

FOR SALE AT VERY POPULAR LOW RATES.

All stock guaranteed breeders. Elegant tabulated pedigrees, suitably framed, furnished with every stallion. Special inducements to parties buying for track work. Come and get your pick at our popular low prices and easy terms. Correspondence solicited. *Send for Catalogue.*

A. O. FOX, Oregon, Dane Co., Wis.

SHORT HORN CATTLE.

Of the blocky, short-legged sort. Form and ability to suckle two good calves without extra feed for the calves is our criterion, pedigree next. At the head of our herd stands DEGRAFF'S SURMISE, a son of the celebrated imported BARON SURMISE, bred by A. Cruickshank, of Scotland.

Our stock is not pampered up for show, nor kept in expensive barns, and we can therefore sell for half the money asked by other breeders.

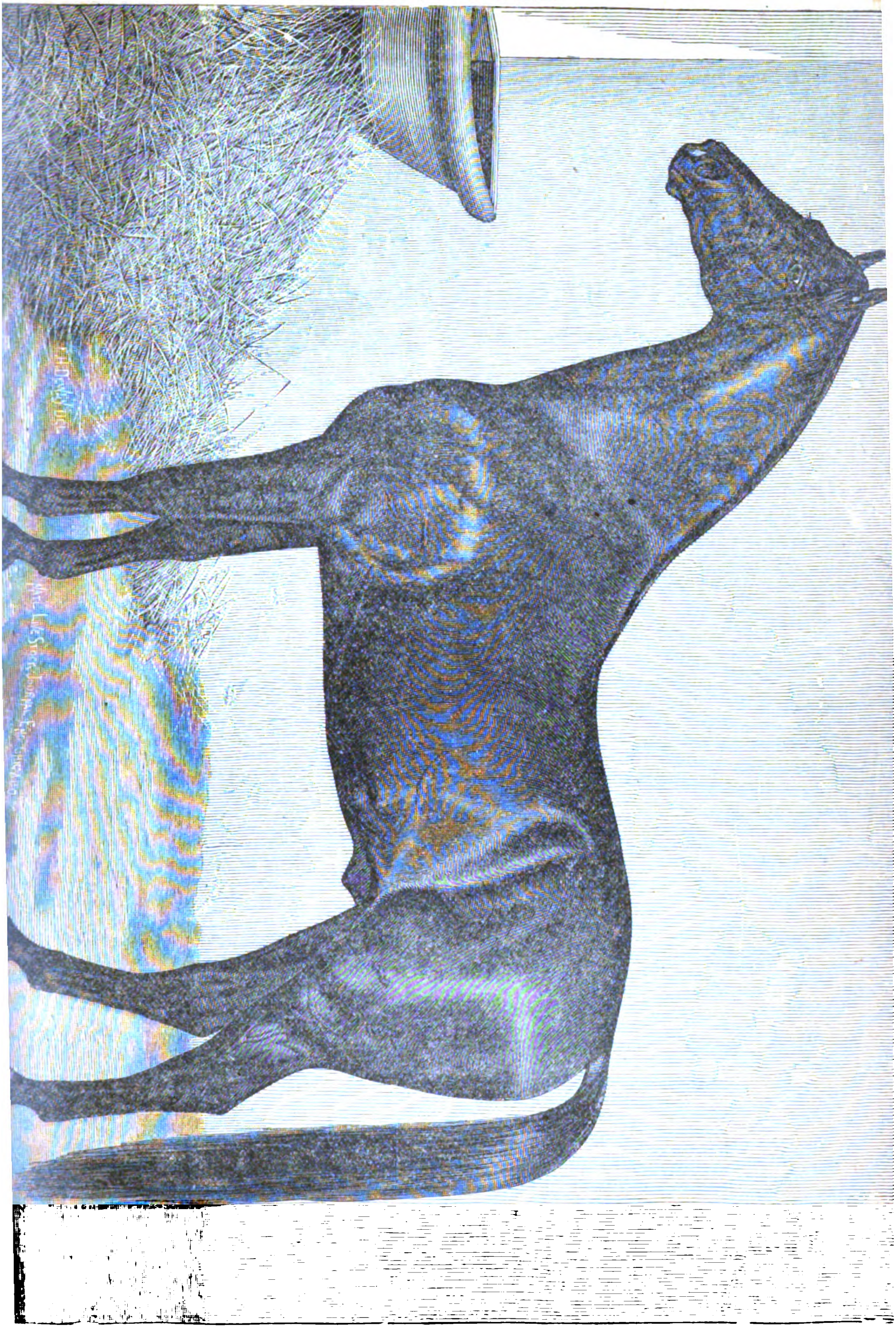
Good, Pure Bred Bulls, $50.

Correspondence Solicited. Send for Catalogue.

A. O. FOX,

OREGON, Dane County, Wis.

"WOODSIDE FARM."



Standard Trotting-Bred Stallion WILCAN 6765. Bay; 16½ hands; weight, 1300 pounds.
PROPERTY OF A. O. FOX, OREGON, DANE CO., WIS.

Cheap Homes

Along the Extensions of the C., M. & St. P. R'y, on Easy Terms.

The Chicago, Milwaukee & St. Paul Railway Co. has recently built hundreds of miles of new road in Iowa, Missouri, Wisconsin and Dakota.

Along these new extensions numerous towns are springing up which promise to become prosperous inland cities within a few years.

At a meeting of the Board of Directors, held in June, 1886, a resolution was adopted directing that, "hereafter, when towns are to be laid out along the Company's lines, the Company through its land department, shall purchase and plat the town sites and sell the lots."

In pursuance of this, the Land Department platted and is now offering lots for sale in these towns at low prices and on easy terms. As will be readily understood, the Company is thus enabled to sell them at less than one-half of what they would cost if in the hands of private speculators. All these towns are in the centers of prosperous farming communities, and are sure to grow rapidly. In all of them merchants find profitable investments, while mechanics and all classes of labor obtain ready employment.

The Company owns land adjoining most of these town sites, and also has land grants in Iowa, Minnesota and Wisconsin, which lands are also for sale on reasonable terms.

For plats, descriptions, prices and other information, address,

C. A. PADLEY,
or *General Land Agent,*
H. G. HAUGAN,
Land Commissioner,
MILWAUKEE, WISCONSIN.

The following is a list of towns, classified by States:

WISCONSIN.

Courtland (Irma), Tomahawk, Minocqua.

MINNESOTA.

Mapleton, Minnesota Lake, Okabena.

South and North Dakota.

Ramona, Oldham, Erwin, Bryant,
Naples, Elrod, Bradley,
Garden City, Butler, Burton,
Langford, Britton,

Newark, Brampton, Sargent,
Harlem, Monango, Edgeley,
Orient, Millard, Hosmer,
Hillsview, Eureka, Eden.

IOWA.

Covington, Atkins, Newhall,
Van Horne, Keystone, Vining,
Gladsone, Ferguson, Haverhill,

Melbourne, Collins, Maxwell,
Huxley, Woodward, Jamaica,
Bagley, Bayard, Dedham,

Templeton, Aspinwall, Manilla,
Astor, Earling, Panama,
Portsmouth, Persia, Buck Grove,

Bell, Kenwood, Charter Oak,
Ute, Rodney, Charles City,
Peru, Cedar Rapids, Highland Center.

MISSOURI.

Powersville, Lucerne, Harris,
Osgood, Laredo, Ludlow,
Braymer, Cowgill, Elmira,
Mosby.

THE CHICAGO MILWAUKEE AND ST. PAUL RAILWAY CO.

Fast Mail Line with Vestibuled Trains between Chicago, Milwaukee, St. Paul and Minneapolis.

Trans-Continental Route between Chicago, Council Bluffs, Omaha, St. Paul and the Pacific Coast.

Great National Route between Chicago, Kansas City and St. Joseph, Mo.

5,700 Miles of Road reaching all principal points in Illinois, Wisconsin, Minnesota, Iowa, Missouri, South and North Dakota.

FOR MAPS, TIME TABLES, rates of passage and freight, etc., apply to the nearest station agent of the CHICAGO, MILWAUKEE & ST. PAUL RAILWAY, or to any Railroad Agent anywhere in the World.

A. J. EARLING, General Manager.
A. V. H. CARPENTER, Gen'l Pass. and Tkt. Agt.

CHICAGO, ILL.

☞For information in reference to Lands and Towns owned by the CHICAGO, MILWAUKEE & ST. PAUL RAILWAY COMPANY, write to H. G. HAUGAN, Land Commissioner, Milwaukee, Wisconsin.

WATCHES

Clocks

—AND—

Silver-Ware,

Dia-monds

—AND—

Jewelry

—SPECIAL STATE AGENTS FOR THE JUSTLY CELEBRATED—

Dueber and Hampden Watches.

The Greatest Variety of Honest Goods at Reasonable Prices
Kept in Wisconsin.

Send to Us for Prices on Anything You Want
at either Wholesale or Retail.

Manufacturing and Repairing

A SPECIALTY WITH US.

O. L. Rosenkrans & Thatcher Co.,

100 WISCONSIN STREET,

MILWAUKEE, - WISCONSIN.

FRED. PABST,

IMPORTER AND BREEDER OF

Percheron Horses,

INVITES THE ATTENTION OF FARMERS AND OTHERS INTERESTED IN HEAVY DRAFT HORSES, TO HIS

Model Percheron Horse Stock Farm,

Situated in the town of WAUWATOSA, three miles west of the city of Milwaukee, Wisconsin, where some of the most carefully selected famous

Percheron Prize Stallions and Mares

Two to three years old and over, all of my own Importation,

ALSO A LARGE NUMBER OF

Pure Native Bred Percheron Horses and Colts

are constantly kept on hand and for sale at very reasonable prices. Visitors always welcome. For further information call on, or address by letter,

FRED. PABST,
Office of Pabst Brewing Co.,
MILWAUKEE, WIS.

A Chance to Make $25.00 in Five Minutes!

——A GRAND OFFER TO OUR READERS BY——

Dr. Valerius & Co.,

——IMPORTERS AND BREEDERS OF——

Clydesdale, English Shire and Percheron Norman Stallions.

Please write in the blank below the names of any stallion men that you know of, and especially anybody that you think wants to buy, cut the blank so filled up out of the Bulletin and mail it to us, after writing your name and address at the bottom in the space provided for that purpose. We will then write to the parties whose names you send, and try to sell them a stallion. If we sell one stallion to any one of them we will pay you twenty-five dollars for your trouble as soon as the sale is made. And for additional stallions sold to the same party, or others on the blank you send, we will pay you twenty-five dollars more for each Stallion sold.

Your name will not be mentioned unless you request it. If you are not satisfied that we will do as we say, you can write to the Wisconsin National Bank, of Watertown, Wis., for information. If it should so happen that the same name be received from more than one person, and a sale is made, then the prize will go to the one whose blank is received first. It is therefore best to fill up your blank and mail it promptly.

Our correspondents sometimes wonder how we can make this liberal offer and yet sell better horses and cheaper than our competitors. Our answer is that we simply spend the money this way instead of paying tens of thousands of dollars every year for newspaper advertising.

Address:

DR. VALERIUS & CO., Watertown, Wis.

NAME.	POST OFFICE.	COUNTY.	STATE.
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....
....	....	....	....

Sent by..Post Office..............................

County....................................State...............................

✠ CHOICE ✠

GRAPES

FOR THE TABLE.

Pure Native Wines.

— ALSO —

SELECTED VARIETIES OF

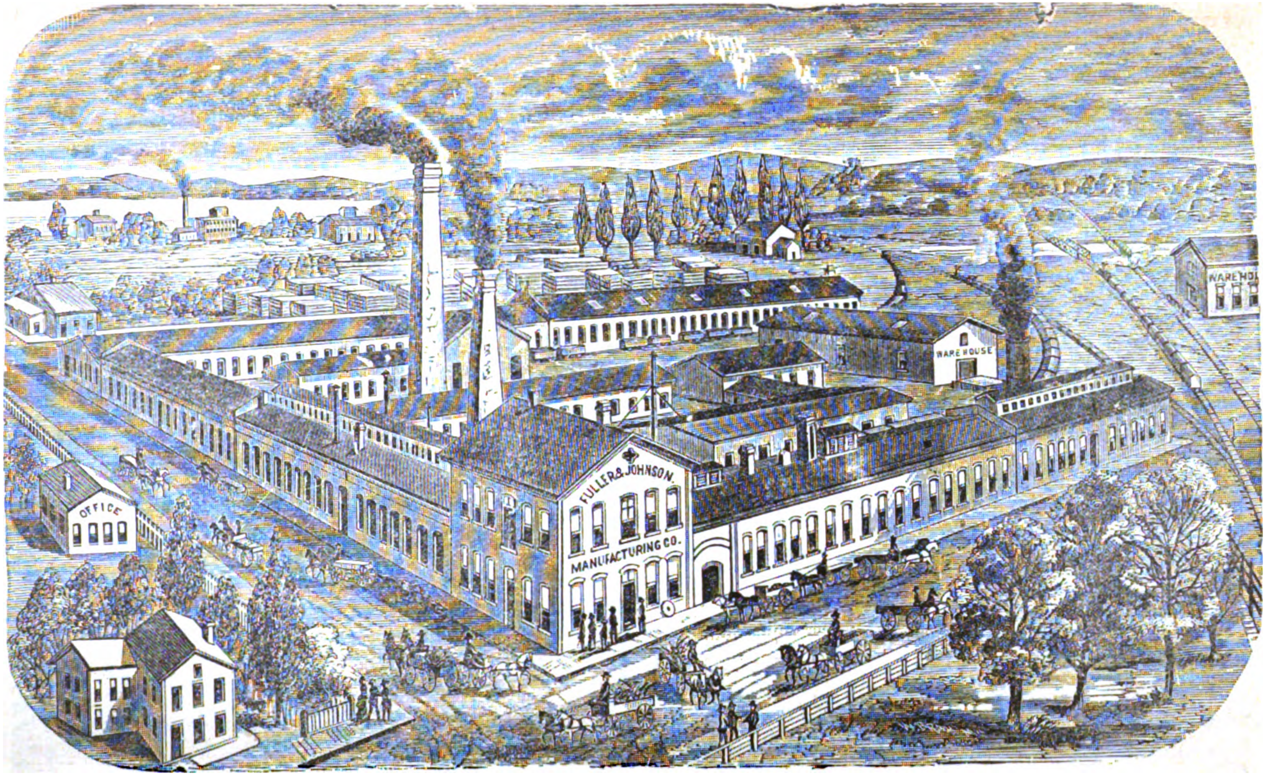
GRAPE VINES

Best Adapted to Wisconsin.

Catalogue Sent on Application.

Correspondence in English or German will receive
Prompt Attention.

WILLIAM FOX, Baraboo, Wis.,
Proprietor Mt. Airy Vineyard.



Works of FULLER & JOHNSON MFG. CO., Madison, Wis.

Manufacturers of Farm Implements, "Red, White and Blue" Mowers, Bonanza, Star, and Johnson Self-Dump Hay Rakes, Bonanza Force Drop Corn Planter and Check Rower, Plows, Cultivators, Harrows, etc. Write them for Illustrated Catalogue, which will be sent postage paid upon application. ☞ THEY HAVE A PERFECT MACHINE FOR PLANTING ENSILAGE CORN.

CHICAGO AND NORTH WESTERN RAILWAY

TRAIN SERVICE

THOROUGHLY ORGANIZED. FULLY EQUIPPED.

Between CHICAGO

ST. PAUL & MINNEAPOLIS,
COUNCIL BLUFFS & OMAHA
DENVER & THE BLACK HILLS.
& ALL POINTS IN

SOUTH DAKOTA

COLORADO,
CALIFORNIA,
OREGON & WASHINGTON.

It is the pleasure of Ticket Agents, at all Coupon Stations, on all connecting lines, to furnish information and Through Tickets over this great Highway.

CHICAGO OFFICES
206 & 208, CLARK ST.

JOHN M. WHITMAN, Gen'l Mang'r.
H. C. WICKER, Traf. Mang'r.
E. P. WILSON. Gen'l Pass'r Ag't.

CHEAP

RAILROAD LANDS!

—IN—

MINNESOTA, DAKOTA, NORTHERN
WISCONSIN AND MICHIGAN,

—FOR SALE BY THE—

Chicago & Northwestern Railway.

Some of the Finest Agricultural, Timber and Cleared Lands in the Northwest are Now for Sale by this Company at

Exceedingly Low Prices!

And on the Most Liberal Terms.

TITLE PERFECT, PLENTY OF GOOD WATER.

Farm Lands adapted to all kinds of farming. **First class** market facilties and everything necessary to make

Farming Easy and Profitable.

☞Maps, prices, terms and all information furnished on application to

C. E. SIMMONS,

Land Commissioner C. & N. W. R'y. - Chicago, Ill.

THE CULTIVATOR
AND
COUNTRY ◆ GENTLEMAN

THE BEST OF THE
AGRICULTURAL ✱ WEEKLIES.

DEVOTED TO

Farm Crops and Processes,
Horticulture & Fruit-Growing,
Live Stock and Dairying,

While it also includes all minor departments of Rural interest, such as the Poultry Yard, Entomology, Bee-Keeping, Greenhouse and Grapery, Veterinary Replies, Farm Questions and Answers, Fireside Reading, Domestic Economy, and a summary of the News of the week. Its MARKET REPORTS are unusually complete, and much attention is paid to the Prospects of the Crops as throwing light upon one of the most important of all Questions—*When to buy and When to sell.* It is liberally Illustrated, and by RECENT ENLARGEMENT, contains more reading matter than ever before. The subscription price is $2.50 per year, but we offer a SPECIAL REDUCTION in our

CLUB RATES!

TWO SUBSCRIPIIONS,	in one	remittance	$4
SIX SUBSCRIPTIONS,	do.	do.	10
TWELVE SUBSCRIPTIONS,	do.	do.	18

☞ SPECIMEN COPIES FREE.

If there is a better agricultural paper, I should like a sample copy! B. N. White, *Oconomowoc, Wisconsin.*

Beaver Dam Citizen: "The best and most reliable Agricultural paper in the United States."

Address,

LUTHER TUCKER & SON, *Publishers,*
ALBANY, N. Y.

R. B. OGILVIE,

BREEDER AND IMPORTER OF

CLYDESDALES.

The Largest Breeding Establishment in Wisconsin, and one of the most important on this side of the Atlantic.

THE MATCHLESS

"McQUEEN"

AND

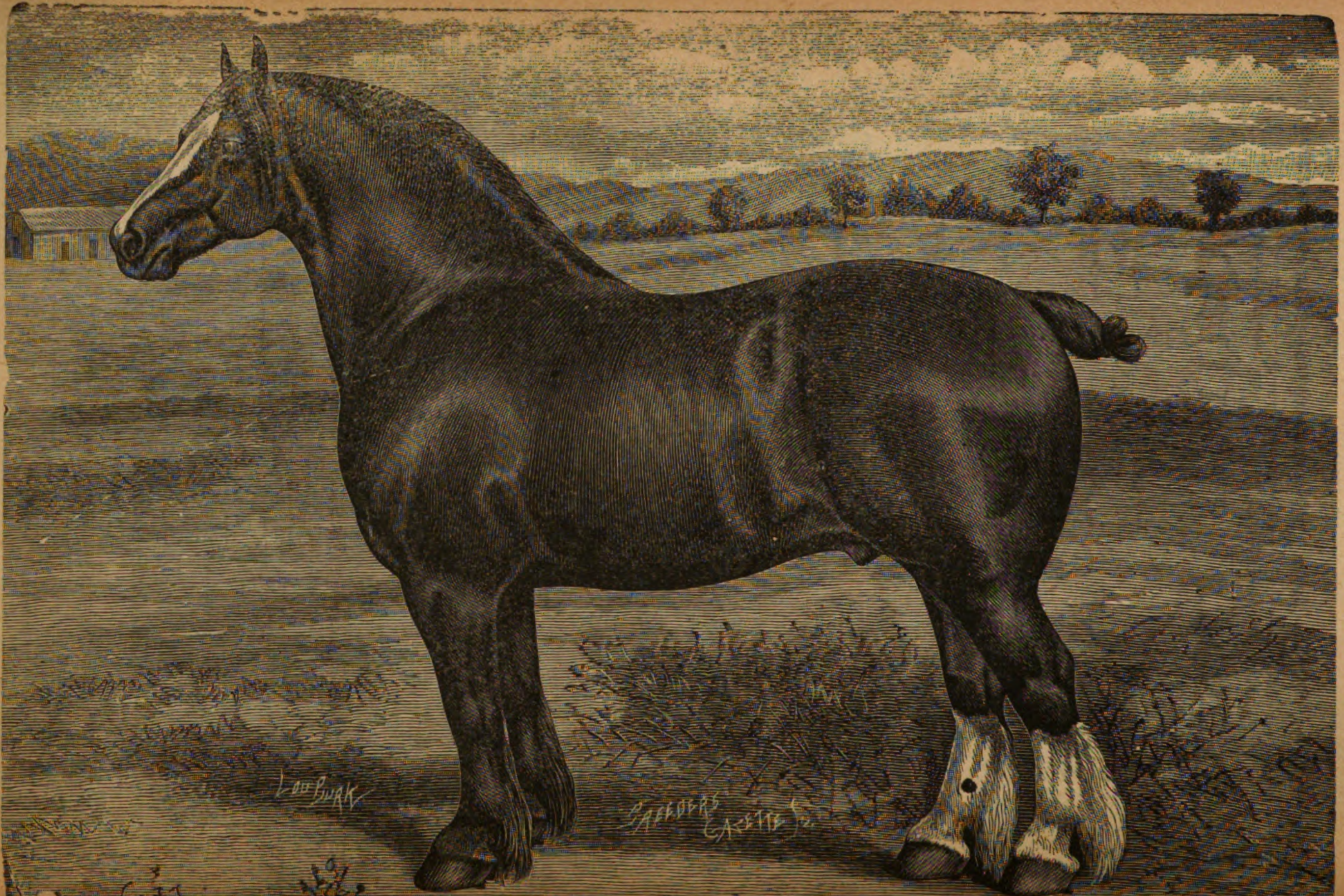
Young Marmion,

AT THE HEAD OF MY STUD.

YOUNG STOCK

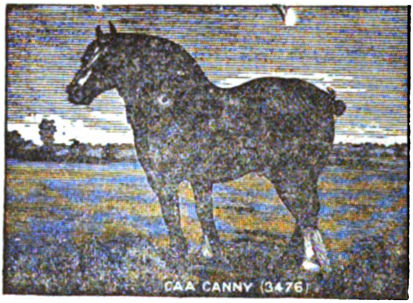
Representing the best types and most fashionable breeding, of both sexes, constantly on hand for sale. Correspondence solicited, and a personal inspection of my animals invited.

R. B. OGILVIE, Madison, Wis.



MC QUEEN 3513 (5200)

REID BROS.,



CAA CANNY (3476)

JANESVILLE, WISCONSIN,

IMPORTERS OF

English Shire,
Clydesdale, and
Cleveland Bay

HORSES

SIXTY HORSES ON HAND.

First-class Horses at Moderate Prices. Seven First Premiums at Wisconsin State Fair, 1888. A fine herd of

POLLED ANGUS CATTLE

—AND—

Shetland Ponies.

Come and see the stock. Correspondence solicited.

☞ ***Mention "Farmers' Institute Bulletin," when Writing to Advertisers.***

THE CHICAGO

AND

NORTH-WESTERN

RAILWAY

BY PROVIDING

SUPERIOR EQUIPMENT and TRAIN SERVICE

HAS ESTABLISHED ITSELF AS

THE FAVORITE LINE

BETWEEN ALL PRINCIPAL POINTS IN

The West and Northwest.

SOLID VESTIBULED TRAINS BETWEEN
CHICAGO AND COUNCIL BLUFFS, OMAHA, ST. PAUL,
MINNEAPOLIS, DENVER AND PORTLAND.

FREE RECLINING CHAIR CARS BETWEEN
CHICAGO AND DENVER AND PORTLAND.

THROUGH PALACE SLEEPING CARS BETWEEN
CHICAGO AND SAN FRANCISCO.

COLONIST SLEEPING CARS BETWEEN
CHICAGO AND PORTLAND.

SUPERB DINING CARS ON ALL THROUGH TRAINS

For information in full detail apply to any Agent of the Chicago & Northwestern Ry., or to the General Passenger and Ticket Agent at Chicago.

W. H. NEWMAN,	J. M. WHITMAN,	W. A. THRALL,
3d Vice-President.	*Gen'l Manager.*	*Gen'l Pass. and Tkt. Agent.*

Mention "Farmers' Institute Bulletin," when writing to Advertisers.

TrottingStallions

Alcazar 5102 by	Sultan.
Gobebic 8556 by	Red Wilkes.
Allencon 9342 by	Lord Russell.
Brighton by	Electioneer.
Wertheim 7462 by	Allandorf.
Manipulator 9341 by	Nutwood.
Increase 9405 by	Mambrino Patchen.
King Piedmont by	Piedmont.
Electrification by	Electricity.

Uihlein Bros.' Stock Farm,

TRUESDELL, WIS.

Located on Main Line of the Chicago, Milwaukee & St. Paul Railway, 32 miles from Milwaukee, and 55 miles from Chicago. Send for Catalogue giving description and pedigree of over

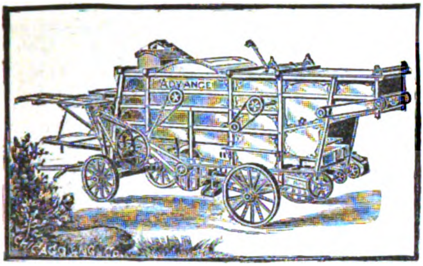
150 Fine Bred Stallions,

BROOD MARES AND COLTS.

ALSO, PURE-BRED NORMAN-PERCHERONS AND CLYDESDALES.

Young Stock, by our own and other Stallions, out of great mares, for sale.

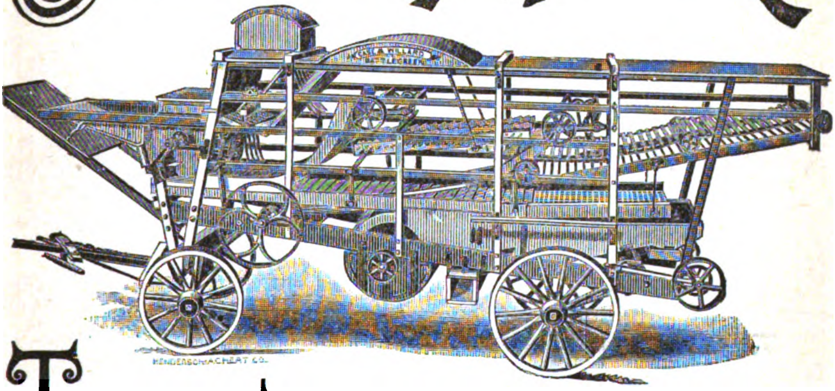
UIHLEIN BROS., Milwaukee, Wis.
HENRY LAUGHLIN, Supt.,
Truesdell, Wis.



THE LATEST.

THE BEST.

ADVANCE


HENDERSON-ACHERT CO.

THRESHING

MACHINERY.

MANUFACTURED BY

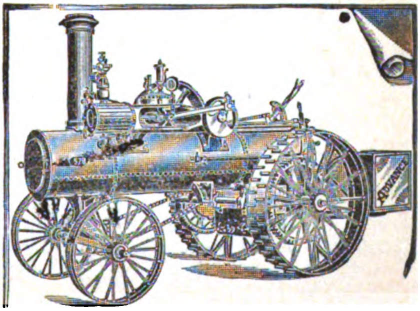
Advance Thresher Co.,

BATTLE CREEK, MICH.

For Pamphlets and full particulars, address

E. H. HEATH,

Madison, Wis.



THOMAS CONVEY

—BREEDER OF—

High Class Poland Chinas.

Only First-Class Pigs Shipped on Order, and Satisfaction Guaranteed.

Visit My Herd and Make Your Own Selection.

Correspondence Solicited.

Plymouth Rock Fowls.

COME AND SEE ME.

THOMAS CONVEY,

Iowa County. Ridgeway, Wisconsin.

JOHN URQUHART,

—Breeder of—

Holstein and Jersey Cattle.

Milk and Butter a Specialty.

I have in my herd some of the best butter families in the world. Satisfaction guaranteed. A choice lot of

Bull and Heifer Calves for Sale,

AT REASONABLE FIGURES.

COME AND SEE THE HERD.

Correspondence solicited.

JOHN URQUHART, Rio, Wis.

"ALWAYS ON TIME."

There is no line so handsomely equipped for Through Passenger Service as "The Northwestern Line."—C., St. P., M. & O. Ry.

All well posted travelers between

THE

Twin Cities and Chicago take this line—particularly favoring the "Vestibule Limited," which carries the finest sleeping cars and coaches ever built, and also all classes of passengers, without extra fares. On the Lake Superior portion of the line, between Minneapolis, St. Paul and Duluth, and St. Paul and Ashland, Pullman sleepers are run on night trains, and parlor cars on day trains.

NORTH-WESTERN

Fast through trains are also run between Minneapolis, St. Paul and Kansas City, via Sioux City, with Pullman sleepers the entire distance, St. Paul to Omaha, Kansas City, Salt Lake, San Francisco and Portland. Dining cars are on all through trains over this line between Minneapolis, St. Paul and Chicago. Besides being the best

LINE

between these principal cities, the Chicago & North-Western system of lines, composed of the Chicago, St. Paul, Minneapolis & Omaha, Chicago & North-Western, and Fremont, Elkhorn & Mo. Valley R'ys (all advertised as the "North-Western Line"), offers the quickest means of reaching all cities and towns in the territory intersected by it. In connection with Union Pacific the C., St. P. M. O. Ry. also forms a through line to the Pacific coast, operated as the Lake Superior, St. Paul & Union Pacific Line. All particulars, with maps and time tables, may be obtained at any station, or at following principal offices:

ST. PAUL: 159 East Third Street.
MINNEAPOLIS: 13 Nicollet House Block.
DULUTH: 332 Hotel St. Louis Block.
CHICAGO: 208 South Clark Street;

Or, address

T. W. TEASDALE,
General Passenger Agent, St. Paul.

L. S., ST. P. & U. P.

These Letters are the Initials of the New Line through Wyoming and Idaho to the Pacific Northwest.

This line is composed of the Chicago, St. Paul, Minneapolis & Omaha and Union Pacific Railways, and reaches more Far Western Cities than any other line, as follows:

Hailey, Boise City, Moscow, and principal Idaho points.

Walla Walla, Colfax, Farmington, Rockford, Spokane Falls, and numerous Washington points.

Baker City, Pendleton, Portland, and principal Oregon points

Ogden and Salt Lake City, the largest points in Utah.

San Francisco, Los Angeles, and all California points from Mt. Shasta to San Diego.

And this line also reaches Butte, Anaconda, and many other points in Montana.

Also note that by this line accommodations are furnished in Pullman Family Sleeping Cars at very low rates to holders of second-class tickets going to Washington, Oregon and California.

When you get ready to go West, before deciding upon your route, call upon the agents of the C., St. P., M. & O. Ry., who will cheerfully furnish rates and all information about through car service over the "Lake Superior, St. Paul & Union Pacific Line" and connections, or address

T. W. TEASDALE,
General Passenger Agent, St. Paul.

Meadowmere Stock Farm

Milwaukee County, Wis.

PROPERTY OF JOHN L. MITCHELL.

STANDARD-BRED

Trotting∴Horses

AND

REGISTERED

JERSEY CATTLE.

STALLIONS:

ALFORD, by Nutwood (2.18¾); Dam, Alta (2.23¼), by Almont.

KELLY, by Gen. Wilkes (2.21¾), son of Geo. Wilkes (2.22); Dam, by Bostwick's Almont (2.29), son of Almont.

AMONG THE BROOD MARES ARE:

CATHARINE (2.28¾), by McDonald Chief, son of Clark Chief; Dam, Fanny (Dam of Jewett 2.14), by John Innes.

CZARINA (2.27½), by Egbert, son of Rysdyk's Hambletonian; Dam, Dolly (Dam of Director 2.17, Thorndale 2.22½, Onward 2.25¼), by Mambrino Chief.

MAZOURKA (2.40¾), by Administrator (2.29¼), son of Rysdyk's Hambletonian; Dam, Cachuca, (Dam of Catchfly 2.18¼), by Almont.

MARY SPRAGUE (2.21), by Governor Sprague (2.20½), Dam by Goldsmith's Abdallah (2.30).

At the head of the Jersey herd stands the bull HARRY'S RIOTER, bred by Campbell Brown, of Tennessee. Sired by Nancy's Rioter, out of Queen Mary, a cow tested at the rate of 18.02¼ pounds of butter to the week.

YOUNG STOCK FOR SALE.

ALEX. A. ARNOLD,

Eastville Farm, Galesville Wis.,

BREEDER OF

SHORT-HORN CATTLE

AND

BERKSHIRE HOGS.

RECORDED CATTLE

AND

REGISTERED HOGS

OF ALL AGES AND SEX, CONSTANTLY ON HAND.

Stock Kept Constantly Thriving,

BUT NEVER PAMPERED.

MILKING QUALITIES MADE A SPECIALTY IN BREEDING SHORT-HORNS.

The Short-horn is standard for beauty and utility and the most valuable breed for the average farmer.

The Berkshire is also the standard hog, and weighs when mature, about 500 pounds, it furnishing, when ready for market, the best pork of all breeds, for the reason that the skin is thin, the bones firm and comparatively small, with more muscle or lean meat than any other breed. They mature early, are good mothers, prolific breeders, and when crossed on the large breeds produce best results.

COME AND SEE THE STOCK.

Correspondence Solicited.

A. A. ARNOLD,
GALESVILLE, WIS.

WISCONSIN
CENTRAL
LINES
NORTHERN PACIFIC
RAILROAD CO.
LESSEE

THE THROUGH ROUTE

TO THE

Great Northwest.

Pullman Vestibuled AND Colonist Sleepers

FROM

Chicago to Tacoma, Wash., Portland, Ore.,

AND THE

PACIFIC ◆ COAST

VIA THE

WISCONSIN CENTRAL and
NORTHERN PACIFIC LINES.

Without Change of Cars.

THE FAVORITE ROUTE BETWEEN

CHICAGO AND MILWAUKEE

AND

Waukesha, Chippewa Falls,
Oshkosh, Eau Claire,
Fond du Lac, Ashland,
Neenah, Duluth,

ST. PAUL and MINNEAPOLIS.

PULLMAN SLEEPERS ON ALL THROUGH TRAINS.

S. R. AINSLIE,
Gen'l Manager, Milwaukee, Wis.

J. M. HANNAFORD,
Gen'l Traffic Manager, St. Paul, Minn.

H. C. BARLOW,
Traffic Manager, Milwaukee, Wis.

LOUIS ECKSTEIN,
Ass't Gen'l Pass'r & Tkt. Agt., Milwaukee, Wis.

JOHNSON & FIELD CO.,

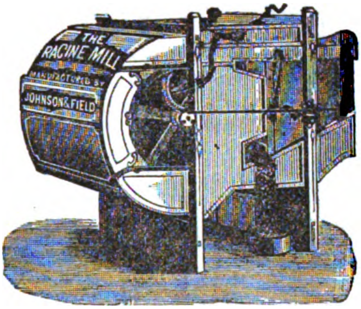
RACINE, WIS.,

MANUFACTURERS OF

THE RACINE

FARM AND WAREHOUSE

The Mill is Guaranteed to do more and better work than any other.

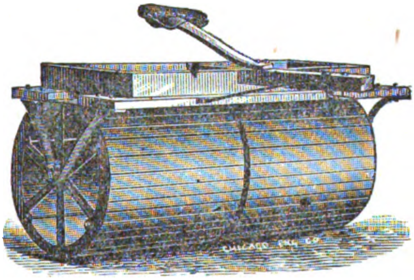


Will do more work thoroughly and has greater capacity than any other Mill. Warranted to give satisfaction Agents wanted.

FANNING MILLS

—AND—

The Best, Cheapest and Strongest Land Rollers in the Market.



Send for Price List and Circular before you buy.

Land Rollers.

AGENTS WANTED.

A. D. BARNES,

—PROPRIETOR OF—

Waupaca Arctic Nursery

—AND—

FRUIT FARM.

The best stock grown for the Northwest. Thirty years' experience in Wisconsin orcharding.

Patronize Home Industry and Get Acclimated Stock.

MY MOTTO:

LIVE AND LET LIVE,
PLANT A TREE AND MAKE IT LIVE.

* * *

A FINE STOCK OF

WAUPACA COUNTY SEEDLINGS.

Give me your patronage, and I will instruct you How to Plant, Cultivate, Prune and Protect.

All Mail Orders Will Receive Prompt Attention, and Satisfaction Guaranteed.

WAUPACA, - - WISCONSIN.

WIND MILLS, PUMPS, TANKS, HAY TOOLS, ETC.

35 Years Experience.

EVERY FARMER HIS OWN MILLER

Do your own Shelling and Grinding at Home, saving tolls and teaming to and from the Grist Mill. This work can be done rainy, windy days, when out-door work is suspended on the farm. The same Mill will cut corn stalks, saw wood, run churn, grindstone, pump water, etc. We make the

HALLADAY GEARED WIND MILL

in 11 sizes, 1½ to 40 horse power, and GUARANTEE they have no equal for Power, Durability and Storm-Defying Qualities.

Horse Powers

and **JACKS** both single and double Geared, made heavy and strong.

IXL 2 HOLE CORN Sheller

Adapted to run by hand, horse, steam or wind power. Not cheaply made, but strong, durable and effective in its working, yet light running. It is constructed similar to the large Power Shellers, and is the best 2-Hole Sheller on the market.

SAW TABLES

Both Swinging and Sliding Tables. We make a Saw Table especially adapted to sawing long poles. Special care is taken to make these machines strong and durable.

THE IXL STALK CUTTER

made in 5 sizes, with **Safety Fly Wheel, Safety Lever,** and all late improvements.

THE IXL IRON FEED MILL

3 sizes, both Belt and Geared Mills. Can be run by any power, and especially adapted to Wind Power. Will grind any kind of grain, and is the lightest running and most effective Feed Grinder made.

IXL TANK HEATER

For warming water in Stock Tanks. Made of the best quality of iron cast in one piece, no sheet iron to rust or solder to melt and cause leak. Will burn any kind of fuel. It is very effective and takes less care to operate than any other Heater made.

35 YEARS Experience

WIND MILLS

THE HALLADAY MILL

is acknowledged the **Standard Wind Mill of the World,** and is made in 18 sizes, 8 to 60 ft. diameter, 1 man to 40 horse power. It is adapted to pumping water for Stock and Dairy Farms, Ornamental and Village Water Supply and Fire Protection, Railway Water Stations, Irrigation, Drainage, Etc.

THE HALLADAY is made upon honor and guaranteed **The Most Powerful, Durable and Best Regulated Storm-Defying Wind Mill** on the market.

U. S. SOLID WHEEL And STANDARD VANELESS WIND MILLS

These Mills are **guaranteed the BEST** of their class. Are not made cheaply, but heavy and strong in construction. They are rapidly taking the lead of all Solid and Vaneless Mills on the market.

PUMPS

We make a complete line of WIND MILL, HAND and POWER PUMPS, Iron, Brass and Brass-Lined CYLINDERS. Our 3 Way Force Pumps have no equal.

TANKS

We make the largest assortment of Tanks on the market, consisting of Round, Half Round and Square Stock Tanks, Milk Cooling Tanks, Storage and House Tanks. Special sizes made to order.

STANDARD HAY TOOLS

For stacking out in fields and mowing away in barns. The use of a good **Hay Carrier** and **Fork** a few hours before a storm may save many times their cost. We make the most complete line of **Horse Hay Tools** on the market, consisting of Anti-Friction, Swivel, Reversible and Rod Hay Carriers, Harpoon and Grapple Hay Forks, Pulleys, Floor Hooks, etc.

ALL GOODS GUARANTEED. SEND FOR CATALOGUE AND PRICES.
RELIABLE AGENTS WANTED in all Unassigned Territory.

U. S. WIND ENGINE & PUMP CO.
BATAVIA, ILLINOIS, U. S. A.

BRANCH HOUSES:—Kansas City, Mo.; Omaha, Neb. **DEPOTS:—Fort Worth, Texas; Boston, Mass.**

THE IMPROVED **ROSS** Ensilage and Fodder Cutters and Carriers.

FIVE NEW LINES OF CARRIERS ADAPTED TO ANY ANGLE OR PLACE.

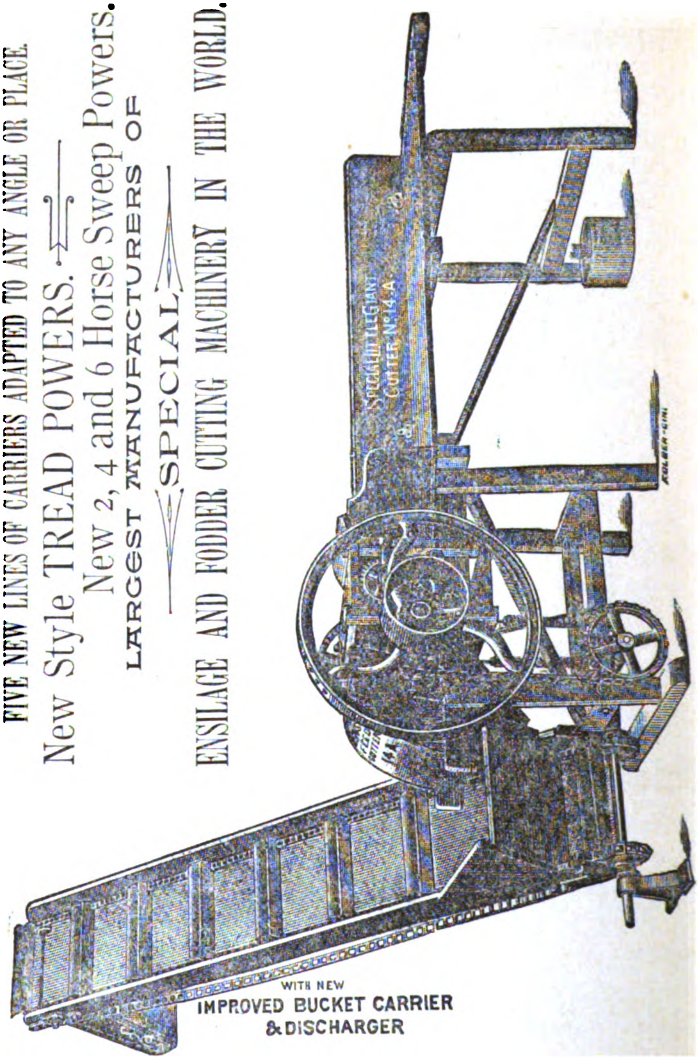
New Style TREAD POWERS.

New 2, 4 and 6 Horse Sweep Powers.

LARGEST MANUFACTURERS OF

SPECIAL

ENSILAGE AND FODDER CUTTING MACHINERY IN THE WORLD.



SPECIAL LITTLE GIANT CUTTER No. 14 A

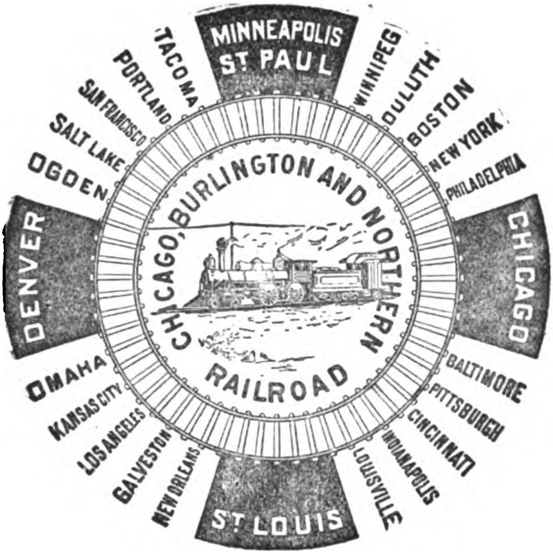
WITH NEW IMPROVED BUCKET CARRIER & DISCHARGER

Warranted stronger and more durable and of greater capacity with equal power than any other line of Cutters manufactured. Liberal inducements to agents. Send for large illustrated Catalogue, free, and six cents in stamps for new 160 page book, "Information on Ensilage and Building of Silos."

Address

THE E. W. ROSS CO.,

Manufacturers, SPRINGFIELD, OHIO, U. S. A.



"The Burlington."

THE VESTIBULED LINE TO

ALL POINTS NORTH, EAST, SOUTH AND WEST.

—THE—

Chicago, Burlington & Northern Railroad,

AND CONNECTING LINES OF THE

"GREAT BURLINGTON ROUTE,"

Offers to the traveling public the most expeditious and comfortable means of reaching

Chicago, St. Paul, Minneapolis, St. Louis, Peoria, Kansas City, St. Joseph, Omaha, Lincoln, Denver and Cheyenne,

From all the Principal Places in Wisconsin and Minnesota.

Its road bed is unexcelled, the grades are light, enabling fast time to be made, and the equipment is of the very best.

Starting from Minneapolis and St. Paul, its line runs along the east bank of the Mississippi to Savanna, Ills., whence one branch diverges east to Chicago, the other south to Fulton, Ills., connecting with the Chicago, Burlington, & Quincy R. R. Pullman sleeping cars to Chicago and St. Louis without change. Peerless dining cars on Limited trains, furnishing an unapproachable cuisine at moderate prices. For tickets, information, etc., apply to any railroad ticket agent, or address,

GEO B. HARRIS, *Vice President.*

W. J. C. KENYON, *Gen. Pass. Agent.*

St. Paul, Minnesota.

MILWAUKEE NORTHERN RAILROAD

THE

Short Line

Between

CHICAGO (Via C., M. & St. P.)

AND

MILWAUKEE

AND

Marquette,	**Mich.**	**Negaunee,**	**Mich.**
Ishpeming,	"	**Houghton,**	"
Hancock,	"	**L'Anse,**	"
Red Jacket	"	**Calumet,**	"
Republic,	"	**Champion,**	"
Iron Mountain,	"	**Gladstone,**	"
Menominee,	"	**Sault Ste. Marie,**	"
Green Bay,	**Wis.**	**Ft. Howard,**	**Wis.**
Marinette	"	**Depere,**	"
Menasha,	"	**Neenah,**	"
Appleton,		**Plymouth,**	"
New London,	"	**Grand Rapids,**	"

Pullman Palace Sleeping Cars on all Night Trains.

C. F. DUTTON,
Gen'l Manager.

W. B. SHEARDOWN,
Gen'l Tkt. Agt.

MILWAUKEE

“SOO LINE”

Minneapolis, St. Paul AND Sault St. Marie Railway.

SERVICE UNRIVALED IN ALL RESPECTS.

Direct Line with Through Trains Daily to

NEW ENGLAND,

BOSTON.

Atlantic Coast Points,

NEW YORK.

CANADIAN PROVINCES,

MONTREAL.

NEW BRUNSWICK,

ST. JOHN.

NOVA SCOTIA,

HALIFAX.

Favorite Route for Summer Tourists. Through Sleepers and Dining Cars to the Atlantic.

F. D. UNDERWOOD, General Manager. } MINNEAPOLIS. { JNO. G. TAYLOR, Gen'l Pass. and Tkt. Agt.

W. S. THORN, Asst. Gen'l Pass. Agent, ST. PAUL, MINN.

Mention “Farmers' Institute Bulletin” when writing to Advertisers.

D. H. ROE & CO.,

54--60 N. CLINTON ST., CHICAGO, ILL.

SOLE WESTERN AGENTS (Excepting Iowa), for

De Laval Cream Separators

EASY TO CLEAN
AND
TO REPAIR.
THEY
NEVER BURST.
HAVE GOT
200 FIRST PRIZES.

CREAM DON'T FOAM
AND
YIELDS MORE BUTTER
THAN
ANY OTHER MACHINE.
CAUSE
NO PATENT SUIT.

De Laval Turbine Separator.

Also General Western Agents for

CHR. HANSEN'S DANISH

BUTTER COLOR,

Cheese Color, Rennet Extract.

Rennet Tablets, Sample by mail, 50 Cts.

UNIFORM, PURE AND STRONG,

Manufactnres and sells everything pertaining to the

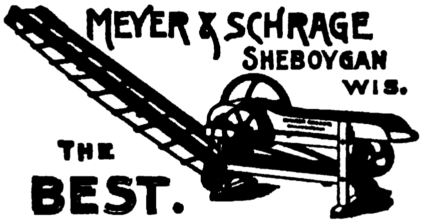
THE DAIRY, THE CREAMERY AND THE CHEESE FACTORY.

Send for Illustrated Catalogue and Price List to

D. H. ROE & CO.,
54--60 NORTH CLINTON STREET, CHICAGO.

Our Machine says "YES" to each question. None other can.

Globe Feed Cutters, Feed Mills and Powers.



Write for Catalogue, Article on Ensilage and Prices.

1. Do the knives cut down?
2. Do they cut off clean?
3. Do they cut off uniform length?
4. Are the knives ground inside?
5. Will the rollers draw perfectly?
6. Are the knives made of solid steel?
7. Is the plate against which the knives cut of steel?
8. Is the fodder firmly pressed while being cut?
9. Will the rollers feed fine marsh hay perfectly, without winding?
10. Is the device for throwing the feed rollers out of gear the very simplest?
11. Are the knives the longest for width of cut, and have they the largest and easiest shear cut?
12. Does the automatic safety fly-wheel ACT with the pulley?

Dr. Wm. Morrow & Son,

NASHVILLE, TENN.,

Breeders of Registered

JERSEY CATTLE.

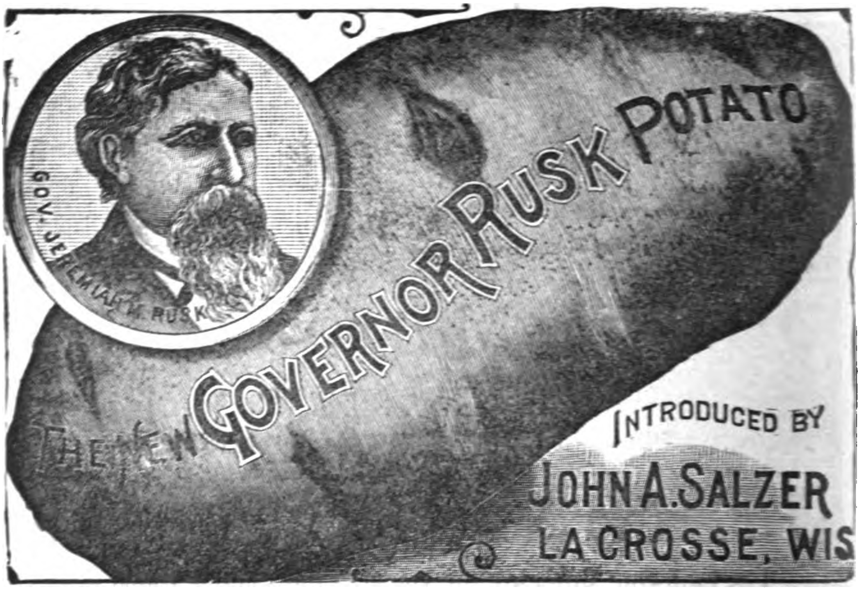
The following Cows are the Dams of our Service Bulls, and we think no other herd in the world can show such a list.

PRINCESS 2d 8046,	test	for	7 days,	46	lbs.,	12½	oz.	butter
ETHLEEL 2d 32291,	"	"	"	30	"	15	"	"
LANDSEER'S FANCY 2876,	"	"	"	29	"	½	"	"
FILLPAIL 2d 24388,	"	"	"	26	"	2	"	"
CHEROKEE ROSE 20921,	"	"	"	23	"	10	"	"
OONAN 2d 1485,	"	"	"	22	"	2½	"	"
ETHLEEL 18724,	"	"	"	19	"	14	"	"
SILVER ROSE 4753,	"	"	"	16	"	14	"	"
DIANA OF ST. L. 6636,	"	"	"	16	"	8	"	"
GERANIUM 3963,	"	"	"	14	"	0	"	"

In the above list are the dams of sixteen tested cows, six of them over 20 lbs. We have sixty-five tested cows in the herd, two sons and twenty daughters of Tormentor 3533, and other good ones.

ONLY YOUNG STOCK FOR SALE.

SALZER'S NORTHERN GROWN SEEDS



THE GOVERNOR RUSK POTATO.

This grand potato, named in honor of the great Farmer Governor of Wisconsin, should be planted on ever farm in America. It is a potato that will sweep the country in yields, and take first prize on beauty and form of tubers and good quality everywhere. See my catalogue, it will tell you all about it.

REMEMBER

That we grow and carry continually in stock the most complete line of Farm Seeds, as Wheat Oats, Barley, Corn, Rye, Potatoes, Grass and Clover Seeds, together with hundreds of varieties of Flower and vegetable seeds, which we sell at very low prices.

Pamphlet on grass culture free. Catalogue free. Write now.

JNO. A. SALZER, La Crosse, Wis.

The Southern Cultivator

AND DIXIE FARMER.

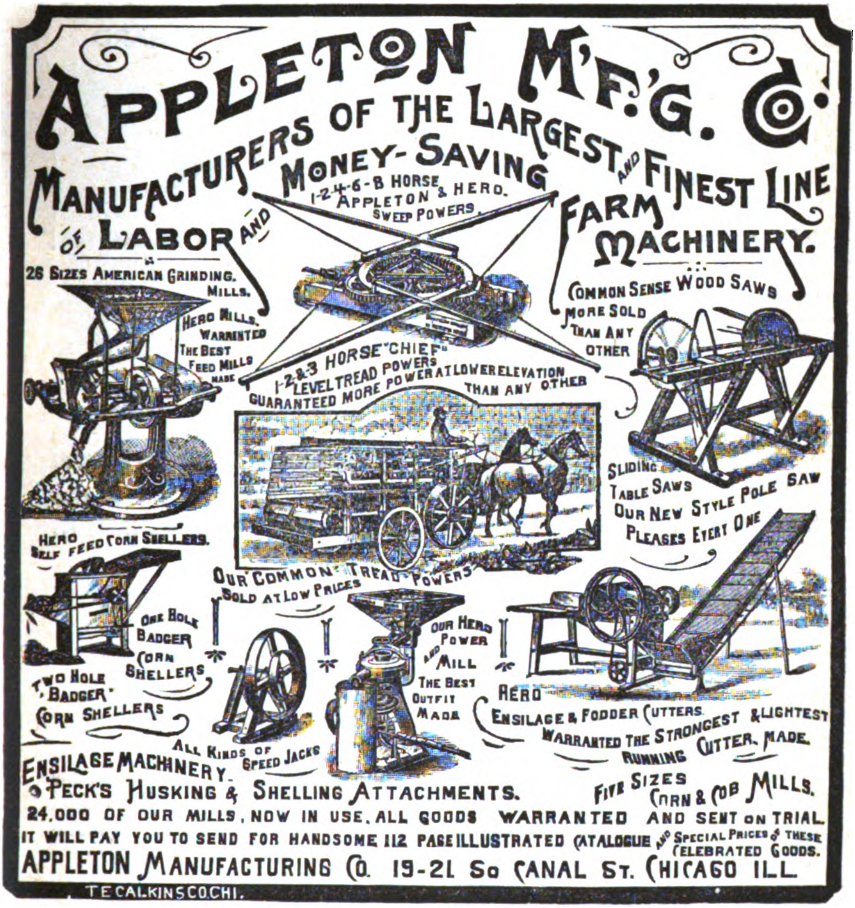
Established in 1843. Leading in 1890. 48th Year, 125,000 Readers.

The most popular and reliable journal of its kind in the south. Endorsed by the press and people as a journal for the farm, fireside and counting-room. It goes to every part of the south and south-west. It is a first-class advertising medium. The recognized organ of southern agriculture and the industrial progress of the south. Farmers, Lawyers and business men read it.

SINGLE SUBSCRIPTION, $1.00.

THE CULTIVATOR PUBLISHING CO., Proprietors,
Drawer M, Atlanta, Georgia.

☞ Address all communications as above.



APPLETON M'F'G. Co.

MANUFACTURERS OF THE LARGEST AND FINEST LINE OF LABOR AND MONEY-SAVING FARM MACHINERY.

1-2-4-6-8 HORSE APPLETON & HERO. SWEEP POWERS.

26 SIZES AMERICAN GRINDING MILLS.

HERO MILLS. WARRANTED THE BEST FEED MILLS MADE

COMMON SENSE WOOD SAWS MORE SOLD THAN ANY OTHER

1-2&3 HORSE "CHIEF" LEVEL TREAD POWERS GUARANTEED MORE POWER AT LOWER ELEVATION THAN ANY OTHER

SLIDING TABLE SAWS

OUR NEW STYLE POLE SAW PLEASES EVERY ONE

HERO SELF FEED CORN SHELLERS.

OUR COMMON TREAD POWERS SOLD AT LOW PRICES

ONE HOLE BADGER CORN SHELLERS

TWO HOLE "BADGER" CORN SHELLERS

OUR HERO POWER AND MILL THE BEST OUTFIT MADE

HERO ENSILAGE & FODDER CUTTERS WARRANTED THE STRONGEST & LIGHTEST RUNNING CUTTER MADE.

ALL KINDS OF SPEED JACKS

ENSILAGE MACHINERY.

PECK'S HUSKING & SHELLING ATTACHMENTS.

FIVE SIZES CORN & COB MILLS.

24,000 OF OUR MILLS, NOW IN USE. ALL GOODS WARRANTED AND SENT ON TRIAL.

IT WILL PAY YOU TO SEND FOR HANDSOME 112 PAGE ILLUSTRATED CATALOGUE AND SPECIAL PRICES OF THESE CELEBRATED GOODS.

APPLETON MANUFACTURING CO. 19-21 SO CANAL ST. CHICAGO ILL.

T E CALKINS CO. CHI.

Factory: APPLETON, WIS.

Branch: MINNEAPOLIS, MINN.

GRASS SEEDS

TIMOTHY, CLOVERS, FLAX, HUNGARIAN, MILLETS, RED TOP, BLUE GRASS, LAWN GRASS, ORCHARD GRASS, BIRD SEEDS, ETC.

POP CORN

We make a specialty of all kinds in large or small quantities.

ENSILAGE CORN

ALL STANDARD VARIETIES, in car load lots or less.

OUR SPECIALLY SELECTED MAMMOTH SOUTHERN SWEET or FODDER CORN has proven itself fully equal the best known. Also, SHEEPS'-TOOTH and RED FODDER.

PLEASE CORRESPOND BEFORE BUYING.

FLAX SEED.

Being dealers, we do not handle on commission, but buy and sell for our own account. Any one having Seed to dispose of is requested to send fair average sample, stating quantity, and we will endeavor to make a satisfactory trade.

REFERENCES: First National Bank, Mercantile Agencies and Merchants generally.

THE ALBERT DICKINSON CO.,

SEED MERCHANTS,

WAREHOUSES:
115, 117 & 119 Kinzie St.
104, 106, 108 & 110 Michigan St.
198, 200, 202 & 204 Market St.

OFFICES, 115 KINZIE ST.,
CHICAGO, ILL.

ASHLAND
M.L.S.&W.RY.
ROUTE

MILWAUKEE, LAKE SHORE & WESTERN RY.

Through Palace Sleeping

—AND—

Parlor Car Line,

—BETWEEN—

CHICAGO AND MILWAUKEE,

—AND—

APPLETON, WAUSAU AND ASHLAND.

The Gogebic, Penokee and Montreal Iron and Mineral Ranges, *Hurley, Ironwood, Bessemer and Wakefield,* and the manufacturing centers and lumbering districts of Central and Northern Wisconsin.

Sheboygan, Manitowoc, Kaukauna, Appleton, Wausau and Rhinelander.

Special Inducements and Facilities offered for the location of **Manufacturing Establishments.**

TO SPORTSMEN.

The most celebrated Fishing Resorts for Bass and Muskallonge in the Northwest are all reached by this Line—

**GOGEBIC LAKE, TOMAHAWK LAKE REGION, TWIN LAKES, LAKE VIEUX DESERT
THE EAGLE WATERS, PELICAN LAKE, THE ONTONAGON, BRULE
AND OTHER TROUT STREAMS.**

Guide Books, Maps, Time Cards, and full information furnished on application to any representative of the Passenger Department.

CHAS. L. RYDER, Gen'l Agt. **A. W. RUSSELL, City Pass. & Tkt. Agt.**
197 Clark Street, Chicago.

Milwaukee City Office, 95 Wisconsin St.

H. F. WITCOMB,
Gen'l Manager,

F. P. REGAN,
Chief Clerk Gen'l Pass. Dept.

MILWAUKEE, WIS.

T. L. KELLY & CO.,

89 & 91 Wisconsin St., and 385 Broadway, Milwaukee.

DRY GOODS.

The greatest variety of useful goods, the best arranged departments, and

The Lowest Prices in the State.

Dress Goods, Silks, Velvets, Cloaks, Shawls, Flannels, Blankets, Merino and All Wool Underwear, Ladies and Children's Muslin Underwear, Hosiery, Gloves, Corsets, Laces, Ribbons, Trimmings, Dress Buttons, Handkerchiefs, Prints, Ginghams, Gents' Furnishing Goods, House Furnishing Goods, Etc., Etc., Etc.

SAMPLES SENT ON APPLICATION.

Goods ordered and left to our judgment to select, may be returned by express at our expense if not satisfactory, if returned immediately and in good order, and other goods will be sent in exchange or the money refunded, as the customer may desire.

Every Lady Visiting our Store Should go through and Examine our

House Furnishing Department.

She will there find hundreds of useful things for the

KITCHEN AND DINING-ROOM,

That she had never thought of, or had neglected to purchase, and which she will not be with out when she sees them and realizes their usefulness and ascertains the Low Prices at which we are selling them.

A VISIT TO OUR ESTABLISHMENT WILL BE INTERESTING AND PROFITABLE TO YOU.

T. L. KELLY & CO.

A Great Railway.

The Chicago, Milwaukee & St. Paul Railway Company now owns and operates fifty-six hundred and seventy-five miles of thoroughly equipped road in Illinois, Wisconsin, Minnesota, Iowa, Missouri, South and North Dakota. Each recurring year its lines are extended in all directions to meet the necessities of the rapidly populating sections of country west, northwest and southwest of Chicago, and to furnish a market for the products of the greatest agricultural and stock raising districts of the world. In Illinois it operates 316 miles of track, in Wisconsin 1,309 miles; in Iowa 1,572 miles; in Minnesota 1,122 miles; in Dakota 1,216 miles; in Missouri 140 miles, and the end is not yet. It has terminals in such large cities as Chicago, Milwaukee, La Crosse, St. Paul, Minneapolis, Fargo, Sioux City, Council Bluffs, Omaha and Kansas City and St. Joseph, Mo., and along its lines are hundreds of large and small thriving cities, towns and villages. Manufacturing interests are cultivated, and all branches of trade find encouragement. The Railway Company has a just appreciation of the value of its patrons, and its magnificent earnings are the result of the good business tact which characterizes the management of its affairs.

The popularity of the line is attested by the fact that notwithstanding the strongest kind of competition of old and new lines, the Chicago, Milwaukee & St. Paul Railway continues to carry the greater portion of all the business between Chicago, Milwaukee, St. Paul and Minneapolis. It is the best patronized route between Chicago, Council Bluffs and Omaha and to and from all points in Wisconsin, Minnesota, Dakota and Iowa, and its Kansas City and St. Joseph line will undoubtedly take equal rank with the older lines leading to and from the Southwest.

On all its through lines of travel the Chicago, Milwaukee & St. Paul Railway runs the most perfectly equipped trains of Sleeping, Parlor and Dining Cars and Coaches. The through trains on all its lines are systematically heated by steam. No effort is spared to furnish the best accommodations for the least money, and, in addition, patrons of the road are sure of courteous treatment from its employes.

FORGET ME NOT

Free Catalogue

— OF —

HOME GROWN

Northern Seeds, Plants, Bulbs, etc.

ALL FROM NEW CROP--TESTED AND PURE.

NO OLD BOX SEEDS.

My Prices in Packets from 2 to 5 cents. In quantity as low as any Responsible House in America.

Crookston, Minn., April 22, 1890.
Your flower seeds were the best we ever used.
JAS. A. BEMIS.

Madison, Wis.
Had radishes in 23 days from planting.
C. N. BROWN,
Attorney-at-Law.

Madison, Wis.
Your Cauliflower seed the best I ever used.
H. TAYLOR.

Curtis, Nebraska.
Seeds came all right, are planted and doing finely.
C. MOFFAT.

Cambridge, Wis., Apr. 2, 1890.
Enclosed please find $3.05 for watermelon seed. Those I bought of you last year were perfect. ot one failed to grow; from $1.00 worth of seed sold $50.00 worth of melons, and gave away as many more.
STACY J. POTTER.

A. R. AMES, Madison, Wis.

THE PRAIRIE FARMER IS THE BEST

Read the opinions from a few of its readers. Space will not allow us to publish thousands of others.

INDEPENDENT, NON-PARTISAN, FEARLESS and ALERT.

The Untiring Advocate of all the rights of Agricultural Communities; an Exponent of Agriculture in the United States.

ESTABLISHED IN 1841.

Published by THE PRAIRIE FARMER PUB. CO., 150 Monroe St., Chicago.

SUBSCRIPTION, $1.00 A YEAR. - - - ISSUED EVERY WEEK.

PUBLISHED IN THE INTEREST OF PRACTICAL AGRICULTURE.

EVERY DEPARTMENT HAS ITS SPECIAL EDITOR,

——Devoted to——

AGRICULTURE, LIVE STOCK, DAIRY, HORTICULTURE, ENTOMOLOGY, VETERINARY, GARDEN AND LAWN, THE FARMER'S CLUB.

——And Welcome in the Home for its——

HOUSEHOLD, POULTRY, APIARY, WEEK'S NEWS, YOUNG FOLKS, PUZZLES, MISCELLANY, ETC.

Original Engravings in every issue give additional interest to the well written Articles.

THE OLDEST AND BEST AGRICULTURAL PAPER IN THE WEST.

WHAT OUR PATRONS SAY:

The familiar face of THE PRAIRIE FARMER has become one of the family, having visited us continually for the last 20 years. J. A. PLATT, Clay Co., Iowa.

We highly appreciate THE PRAIRIE FARMER, and think it is a paper that should find its way into every farm-house. G. B. MUNGER, Livingston Co., Ill.

I am highly pleased with THE PRAIRIE FARMER, and consider it the best paper of the kind that I have ever seen. R. H. BAKER, Pike Co., Ill.

I am well pleased with THE PRAIRIE FARMER. It is the best paper I have ever read.
C. S. GOULD, Jasper Co., Iowa.

Have taken THE PRAIRIE FARMER 30 years, and it seems to grow better and better.
D. J. PARKER, Whiteside Co., Ill.

I have taken THE PRAIRIE FARMER every year since January 1, 1849, and must say that under its present management it is better than ever before. NICHOLAS MILLER, Scott Co., Iowa.

THE PRAIRIE FARMER itself is perfect, and the king of farmers' papers.
WM. A. JEFFERSON, Boone Co., Ia.

THE PRAIRIE FARMER is just what every farmer should subscribe for; it is interesting for everybody, old and young. R. S. HARTER, Kane Co., Ill.

I have read many farm papers, and the general make-up of THE PRAIRIE FARMER suits me the best of any I have read. ALEXANDER DAVIS, Madison Co., Ind.

I like THE PRAIRIE FARMER well. It is a thoroughly practical farm paper, chock full of useful information. I. A. PATRICK, Clay Co., Ill.

I consider THE PRAIRIE FARMER a model paper, well suited to the mass of farmers.
A. W. REEVES, Cook Co., Ill.

THE PRAIRIE FARMER is a good paper and keeps up with the times. After looking for a paper for my family, among all others selected it as the best. H. C. LUDINGTON, Warren Co., Iowa.

Farmers are being waked up to the real situation of affairs by such articles as appear in THE PRAIRIE FARMER and are uniting for business. Keep on in your good work.
S. P. FLEMING, Cass Co., Mo.

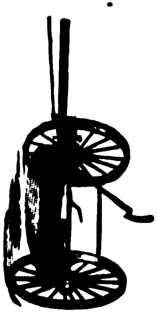
Success to THE PRAIRIE FARMER. Your paper is a good one. No farmer ought to be without a copy of same. MR. O'DONELSON, Seward Co., Nebr.

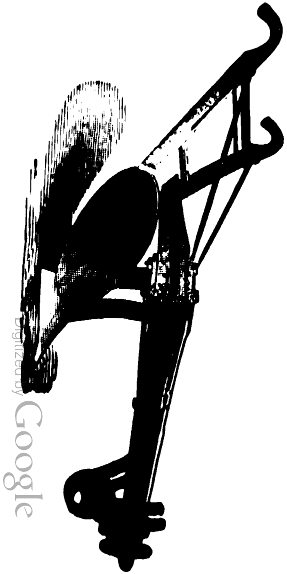
Your tone on the great economic questions of the day are so pat to the mark that I must hold on to THE PRAIRIE FARMER. J. F. S. SMITH, Antelope Co., Nebr.

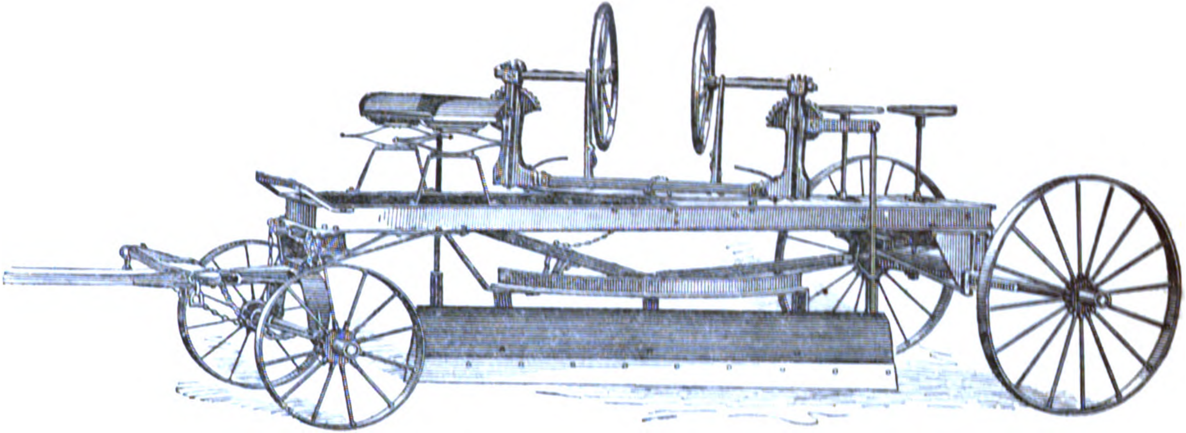
Last year I carried an ad in your paper and also in three poultry journals; but as your rates seemed high, I concluded to advertise only in the poultry papers this year. Accordingly I made our contracts with five of those journals the first of the year. But I have concluded that my little ad. in THE PRAIRIE FARMER paid me best in the end, as I am still getting an occasional order from that source.
H. L. BALLARD, McLean Co., Ill.

Send for Specimen Copies and Terms, Rates of Advertising, etc., to

THE PRAIRIE FARMER PUB. CO., Chicago, Ill.







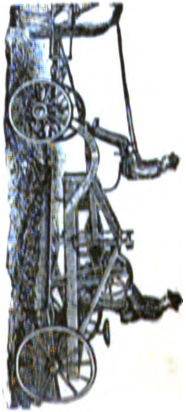
American Road Machine Co.,

of Kennett Square, Pa.,

Manufacture a full line of Road Making Machinery, including seven different sizes and styles of Road Machines, ranging in Price from one hundred to two hundred sixty-five dollars. All Thoroughly Warranted. *Send for Catalogue.*

C. W. POTTER, State Agent, Mauston, Wis.

☞ General Office and Transfer House, Madison, Wis.



THE

Green Bay, Winona & St. Paul R. R.

—IS THE—

SHORTEST ROUTE

—FROM—

GREEN ◆ BAY

And all points in **EASTERN WISCONSIN** to

NEW LONDON, MERRILL, STILLWATER,
STEVENS POINT, WINONA, HUDSON,
GRAND RAPIDS, LA CROSSE, EAU CLAIRE,
WAUSAU, CHIPPEWA FALLS,

St. Paul, Minneapolis, Sioux City, Omaha

AND COUNCIL BLUFFS,

And all points in Minnesota, Dakota, and all points on the NORTHERN PACIFIC RAILROAD and ST. PAUL, MINNEAPOLIS & MANITOBA RAILROAD; is the

SHORT LINE

From WINONA, LA CROSSE, and all points on the CHICAGO, BURLINGTON & NORTHERN RAILROAD, WINONA & ST. PETER RAILROAD and SOUTHERN MINNESOTA RAILROAD, to

MERRILLAN, STEVENS POINT, FOND DU LAC,
NEILLSVILLE, APPLETON, SHEBOYGAN,
GRAND RAPIDS, OSHKOSH, GREEN BAY,

—AND ALL POINTS IN—

Eastern Wisconsin, Northern Michigan and Lake Superior Regions.

Passengers from all points—West, Northwest and Southwest—will find the

G. B., W. & St. P. R. R.

The **DIRECT LINE** to all the above points.

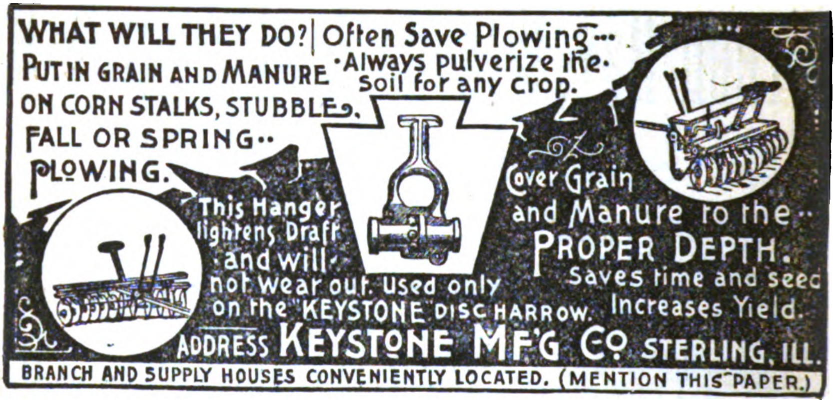
THE PASSENGER EQUIPMENT of this Road embraces all the modern improvements and conveniences that tend to make traveling by rail safe and comfortable.

☞Be sure your tickets read via the

GREEN BAY, WINONA & ST. PAUL RAILROAD.

S. W. CHAMPION, Superintendent. J. B. LAST, Asst. Gen. Pass. Agt.

☞*Mention "Farmers' Institute Bulletin" when writing to Advertisers.*



WHAT WILL THEY DO? | Often Save Plowing... Always pulverize the Soil for any crop.

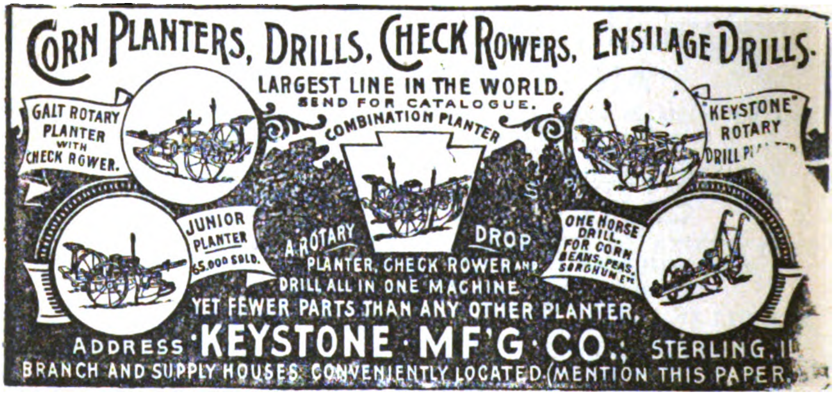
PUT IN GRAIN AND MANURE ON CORN STALKS, STUBBLE, FALL OR SPRING PLOWING.

This Hanger lightens Draft and will not wear out. Used only on the "KEYSTONE" DISC HARROW.

Cover Grain and Manure to the PROPER DEPTH. Saves time and seec Increases Yield.

ADDRESS KEYSTONE MF'G CO. STERLING, ILL.

BRANCH AND SUPPLY HOUSES CONVENIENTLY LOCATED. (MENTION THIS PAPER.)



CORN PLANTERS, DRILLS, CHECK ROWERS, ENSILAGE DRILLS.

LARGEST LINE IN THE WORLD.
SEND FOR CATALOGUE.

GALT ROTARY PLANTER WITH CHECK ROWER.

COMBINATION PLANTER

"KEYSTONE" ROTARY DRILL PL

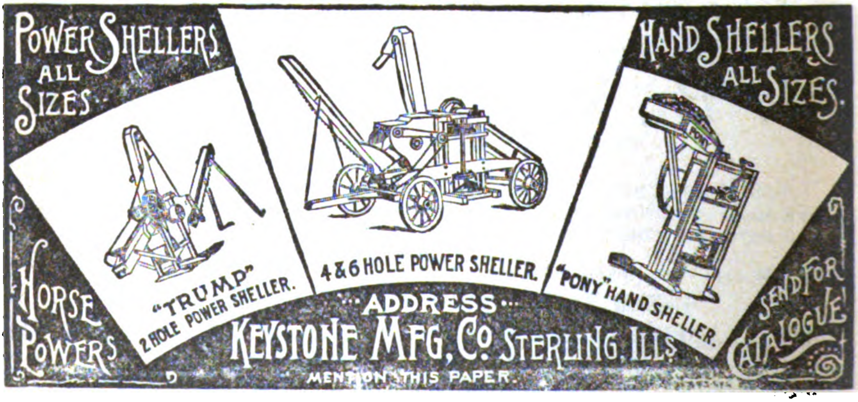
JUNIOR PLANTER 65,000 SOLD.

A ROTARY DROP PLANTER, CHECK ROWER AND DRILL ALL IN ONE MACHINE.
YET FEWER PARTS THAN ANY OTHER PLANTER.

ONE HORSE DRILL. FOR CORN BEANS, PEAS, SORGHUM ETC.

ADDRESS KEYSTONE MF'G CO., STERLING, IL

BRANCH AND SUPPLY HOUSES CONVENIENTLY LOCATED (MENTION THIS PAPER



POWER SHELLERS ALL SIZES.

HAND SHELLERS ALL SIZES.

"TRUMP" 2 HOLE POWER SHELLER.

4 & 6 HOLE POWER SHELLER.

"PONY" HAND SHELLER.

HORSE POWERS

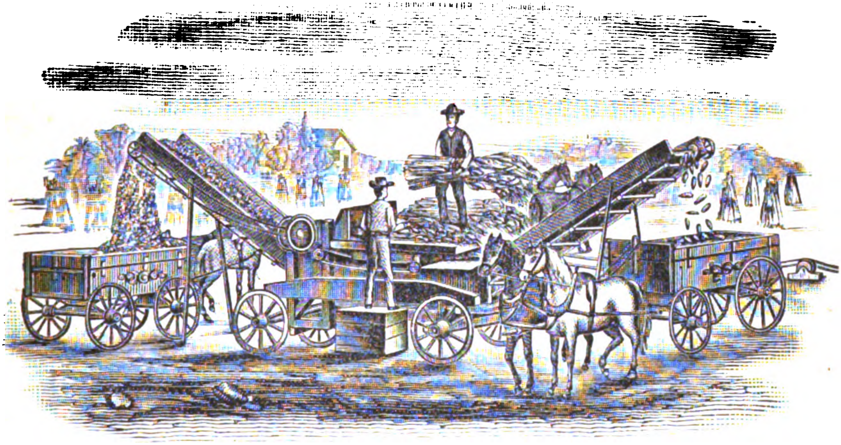
SEND FOR CATALOGUE!

ADDRESS
KEYSTONE MFG. CO. STERLING, ILLS.
MENTION THIS PAPER.

"KEYSTONE"

Corn Husker and Fodder Cutter

COMBINED.



IT IS A SUCCESS. SEND FOR ILLUSTRATED CATALOGUE.

A VOICE FROM KANSAS ABOUT THE HUSKER.

C. C. Gardiner, of "Bright Side Stock Farm," Bradford, Kansas, writes us June 19, 1890, in reference to the Corn Husker:

"I had some trouble in adjusting the Corn Husker to my two horse tread power, but after experimenting some, Presto! Eureka! we got there hands and feet! The horses traveled nearly natural, but still a little slow, but it gave all the motion to the Husker that was necessary. When the fodder was dry we could run it through as fast as it could be put upon the platform.

"The corn went 60 bushels to the acre and the fodder was large. It had to be fed on the jump to keep the Corn Husker up to its capacity. It took one man to load on table as fast as the Corn Husker would take it. We could not have husked more if we had had an engine. It worked us hard and we were obliged to reduce the speed. We fed one large load through in 30 minutes, aud we were obliged to rest 20 minutes before starting again, we were so exhausted.

"I was using two 1200 lb. horses, and we have husked 150 bushels in 4 hours. By using a tread power instead of an engine or sweep power, we saved one man's wages and the fuel for an engine. I raise from 150 to 200 acres, and it has been an unsolved problem with me for a good many years how to handle the fodder crop, but it is now solved by using the Keystone Corn Husker and Fodder Cutter. I make it a practice to utilize the "by" products of the farm, such as straw and fodder, and to which I attribute my success in farming."

Superb Train Service,
Good Connections,
Fast Time and No Delays

Can all be secured by taking the

Northern
Pacific R. R.

BETWEEN THE EAST AND

Dakota, Manitoba, Montana,
Idaho, Washington Territory,
British Columbia,
Oregon and California.

THIS IS THE

Yellowstone Park AND Dining Car Route.

The NORTHERN PACIFIC RAILROAD is the SHORT LINE to HELENA, TACOMA, SEATTLE, and PORTLAND, ORE.; is the ONLY LINE running PULLMAN SLEEPING CARS to FERGUS FALLS, GRAND FORKS, GRAFTON, WINNIPEG, FARGO, HELENA and BUTTE CITY, and is the ONLY LINE reaching JAMESTOWN, BISMARCK, MILES CITY, BILLINGS, BOZEMAN, MISSOULA, SPOKANE FALLS, TACOMA and SEATTLE.

Pullman Sleepers, Dining Cars,

AND

FREE COLONIST SLEEPERS

ON EXPRESS TRAINS DAILY.

This Line Offers Special Attractions to California Tourists.

For full information concerning rates, time, etc., call on or address your nearest ticket agent, any traveling passenger agent of this company, or

CHAS. S. FEE,
Gen. Pass. and Ticket Agt., N. P. R. R.,
ST. PAUL, MINN.

THE IOWA HOMESTEAD

ONE OF THE FIRST PAPERS TO PUBLISH A FULL

ALLIANCE DEPARTMENT

Containing Alliance news from all parts of the United States, and weekly discussions of Alliance principles, will be

Sent Free for Four Consecutive Weeks

to any farmer who will send his name and address on a postal card to the

HOMESTEAD CO., DES, MOINES, IOWA.

At the end of four weeks it will be discontinued without notice, unless subscribed for in due form at the rate of $1.00 per year, invariably in advance.

"THE HOMESTEAD"

is a twenty-four page weekly, devoted to the advancement of the agricultural interests, and claims to be the cheapest agricultural paper in the western states. Whether this claim is well founded or not can be ascertained by any farmer at the expense of one cent, by sending his name and address on a postal card to the

HOMESTEAD CO.,

DES MOINES, IOWA.

C. S. Clelland,
JANESVILLE, WIS.
REGISTERED
Merino
Sheep.

350 + REGISTERED + SHEEP.
TWENTY-SIX YEARS IN THE BUSINESS.
LARGE SHEEP, STRONG CONSTITUTION AND A HEAVY FLEECE OF FINE WOOL.
COME AND SEE THE FLOCK.

ATTEND
The Northwestern Business College,
ACADEMY, AND SCHOOL OF SHORT-HAND AND TYPE-WRITING.

IF YOU
Want a Good Business Education.
Want to Learn Short-Hand and Type-Writing.
Wish to Improve in Penmanship.

IF YOU
Wish to Prepare for the State University.
Wish to Prepare for Teaching.
Wish to Obtain a Practical Education.

The Commercial and Short-hand Departments are open during the entire year, and Students can enter at any time.

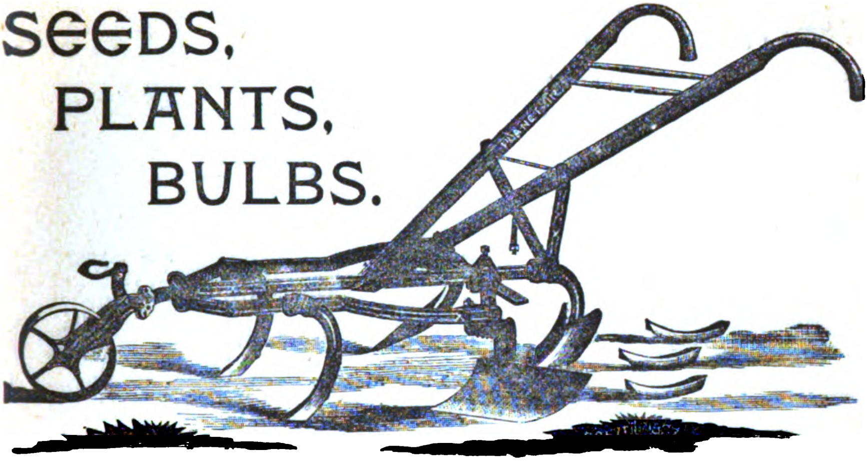
The Fall Term of the Academy Commences September 1, 1890.

☞ Catalogue containing full information sent to any address free.

DEMING and PROCTOR, Principals,
MADISON, WISCONSIN.

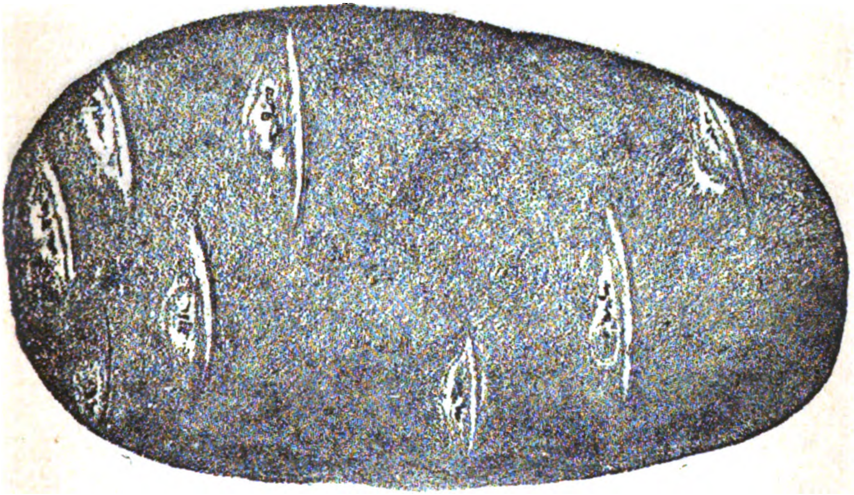
Mention "Farmers' Institute Bulletin" when writing to Advertisers.

SEEDS,
PLANTS,
BULBS.



Wholesale and Retail Dealers in

AGRICULTURAL & GARDEN IMPLEMENTS.



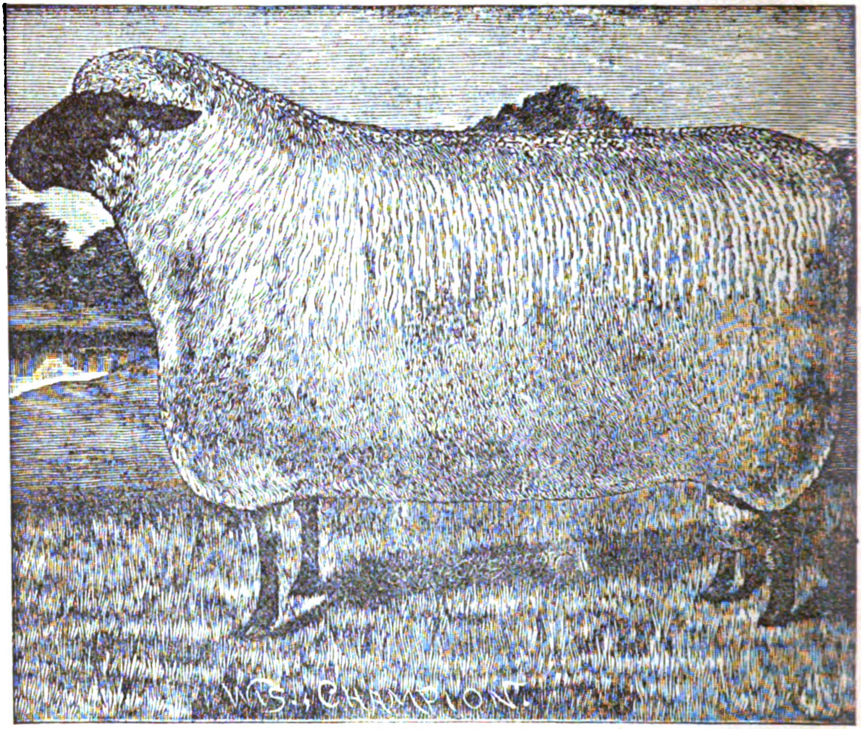
"CREAM CITY."

Introducers of this famous Potato; conceded **by all growers as the best early Potato now** in the market. It **is** a large yielder, cooks quick and dry very much like the **old Snowflake.** The flesh is pure white. **As a** keeper it is unsurpassed, **showing no disposition to sprout** until late in spring.

CURRIE BROS., Seedsmen and Florists. Milwaukee.

STORES: 108 Wisconsin Street and 312 Broadway.
GREEN-HOUSES: Cor. State and 27th Sts., and Cor. 10th St. and Grand Avenue.
Illustrated Catalogue furnished free on application.

→Over 400 Prizes in Three Years.←


WIS. CHAMPION.

——RECORDED——

Oxford Down, Shropshire,

——AND——

SOUTHDOWN SHEEP.

Cheshire Hogs and Bronze Turkeys

Of Extra Quality, Bred and Imported by

GEO. McKERROW, *Sussex, Waukesha Co., Wis.*

Velvet Chaff and Turkish Red Winter Wheat.

OUR MOTTO: "THE BEST IS NONE TOO GOOD."

R. R. STATIONS–Templeton, on Wisconsin Central, and Pewaukee, on Chicago, Milwaukee & St. Paul.

COME AND SEE US, OR WRITE.

ILLINOIS · CENTRAL R·R·

The Popular SHORT LINE BETWEEN CHICAGO, ROCKFORD, FREEPORT, DUBUQUE, WATERLOO, SIOUX CITY & SIOUX FALLS.

Pullman Sleepers, Reclining Chair Cars ON ALL TRAINS.

THE SHORT AND DIRECT AND ONLY THROUGH SLEEPING CAR ROUTE BETWEEN

Chicago and New Orleans

TIME LESS THAN 35 HOURS.

THE ONLY TRUE WINTER ROUTE TO Los Angeles & San Francisco • VIA NEW ORLEANS •

RATES AS LOW AS BY ANY OTHER ROUTE

ILLINOIS CENTRAL R.R. BETWEEN CHICAGO AND ST. LOUIS

FREE RECLINING CHAIR CARS ON ALL TRAINS FREE

ELEGANT PULLMAN BUFFET SLEEPERS ON NIGHT TRAINS.

SEE THAT TICKETS READ VIA ILLINOIS CENTRAL R. R.

T. J. HUDSON, Traffic Manager.
M. C. MARKHAM, Ass't Traffic Manager.
A. H. HANSON, General Passenger Agent.

☞ *Mention "Farmers' Institute Bulletin" when Writing to Advertisers.*

The four Danish Dairymaids from Copenhagen Working Dairy.

CHR. HANSEN'S

DANISH

RENNET EXTRACT,

CHEESE COLOR.

Butter ❀ Color.

Rennet Tablets by mail, 50 Cts.

Over 100 First Prize Medals.

UNIFORM, PURE, STRONG.

PATRONS ARE INTERESTED IN THEIR FACTORIES USING THE BEST ONLY.

Order of the nearest dealer or of our Western Agents, or

D. H. ROE & CO.,
51 to 60 N. Clinton St.

CHICAGO, ILL.

Creamery Package Mfg. Co.,
26 N. Clark St.

J. H. MONRAD, Western Representative CHR. HANSEN'S LABORATORY.

Extra Good Victoria Swine and Jersey Cattle.

First-class Pigs shipped and satisfaction guaranteed. Visit my herd and make your own selection. All stock recorded. Correspondence solicited.

GUSTAV SCHROETER,
Grafton, Ozaukee Co., Wis.

MORGAN'S LINENS.

RECOGNIZING the fact that it is a somewhat difficult thing for our out of-town customers to make selections of LINENS with out seeing the goods, we submit to their notice a few which are specially desirable. Send a sample order, and if the articles be not entirely satisfactory you can return them at our expense. A complete price list of Linens and White Goods will be found in our "Summer Supplement," which you can have free by mail on application.

TABLE DAMASK.

Our 62 inch wide yard-bleached cream Table Damask, extra heavy, at only 50c a yard, is a decided bargain. Large and varied assortment of patterns in square and floral designs.

Our 63 inch wide and 66 inch wide extra fine bleached Table Damask, at only **75c** and **85c** a yard, respectively, cannot be surpassed. New and elegant patterns, comprising large and small polka dots, checks and floral and running vine designs.

Our **$1.00** a yard heavy bleached Double Damask is splendid value, and a quality of which our sales are very large. The patterns of these goods are some choice novelties, in fruit, floral, leaf and geometrical designs, and are confined to our own trade.

⁂ We have 20x20 and 24x24 Napkins to match most of the designs of the above damask. ⁂

TABLE NAPKINS.

Our 19x19 bleached Table Napkins at **$1.50** a dozen and 20x20 bleached double Damask Napkins at **$1.75** and **$2 00** a dozen are very cheap. These goods improve with the washing.

Our 23x13 double bleached damask Napkins at **$2.00** a dozen and our 23x23 double damask Napkins at **$2 50** a dozen are splendid values.

Our 24x24 bleached double damask Napkins at **$3.00, $3.50** and **4.00** a dozen are both choice and cheap.

TOWELS.

Our 18x36 all-linen Huck and Damask Towels at 12 1-2c each are extremely popular.

22x45 all linen Huck and Crepe Towles at 20c each are much below regular prices.

Our **25c** line of Towels comprises Huck, Damask, Crepe, Basket Weave, etc. This line is the best that can be had at the price.

We pay freight or express on all Linens sent to points in Wisconsin.

JAMES MORGAN,

386, 388 AND 390 E. WATER ST., MILWAUKEE, WIS.

SEND ROR SAMPLE COPY

OF

HOARD'S ◆ DAIRYMAN,

FORT ATKINSON, WIS.

W. D. HOARD, EDITOR AND PROPRIETOR.

A Weekly Twelve-page Paper Devoted Entirely to the Dairy and Dairy Stock Interests. Circulation distributed throughout the dairy districts of the United States, Canada and in Europe.

The Official Organ of the Wisconsin Dairyman's Association.

ONE OF THE MOST SUCCESSFUL ADVERTISING MEDIUMS IN THE UNITED STATES.

Rates furnished upon Application.

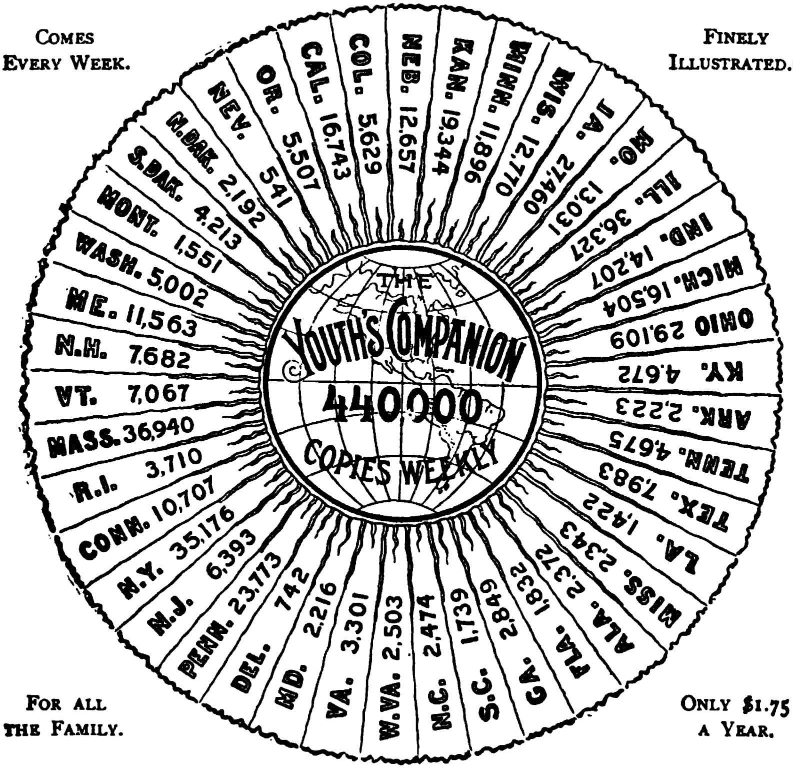
Subscription Price, $1.00 a Year.

THE YOUTH'S COMPANION

Established 1827.

COMES
EVERY WEEK.

FINELY
ILLUSTRATED.



FOR ALL
THE FAMILY.

ONLY $1.75
A YEAR.

Two Million Readers.

The Figures in the illustration above show the number of yearly subscribers to THE YOUTH'S COMPANION in each of the forty-two States. It is interesting to note how generally THE COMPANION is distributed throughout the country.

Subscriptions can begin at any time of the year. Price $1.75 a year, post-paid. Illustrated Supplements nearly every week. SAMPLE COPIES FREE. Address,

THE YOUTH'S COMPANION, Boston, Mass.

(Send Check, Money-order, or Registered Letter at our risk.)

200 BERKSHIRE SWINE 200

W. H. JACOBS, Madison, Wisconsin,

Importer and Breeder of the Large, Improved

English Berkshire Swine.

I have now over Two Hundred head of Swine, every one either Registered or Eligible for Registration. I have at the head of my herd

IMPORTED PRINCE REGENT.

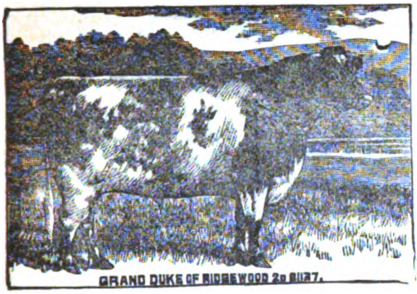
Have a large number of young Boars ready for service now. None but the best kept for breeding purposes. I use the knife freely. I have shipped to many different states this year. Have special rates by different express companies. All stock delivered at express office free of extra charge. I guarantee all stock sold by me breeders, and always sell at lowest prices possible. I breed Berkshire because they are an active hog, better calculated to follow cattle than any other breed. Commission men in Chicago say that they are worth more per cwt. than any other hog. Easily moved from one pen to another. Less cripples and dead ones in a car than any other breed. Packers as well as experience tell us that they have a larger per cent. of lean meat than any of the other pure breeds; and they are always ready for market if properly fed.

For prices and particulars address

W. H. JACOBS,

Madison, Wis.

Or, call on P. WAKEM, Manager of the Farm, Burke Station, five miles from Madison on the C., M. & St. Paul R. R.



GRAND DUKE OF RIDGEWOOD 2D 81127.

✱175✱

Short Horns.

WM. H. JACOBS,

Madison, **Wis., Importer and Breeder of**

SHORT HORN CATTLE.

My herd consists of such families as Barringtons, Princess, Kirklevington, Fennell Duchess, Roan Duchess, Mazurkas, Adelizas and a number of other very useful families. Headed by the imported bull Welcome Guest 101271, bred in England, assisted by the Booth bull, British Ensign 96490, and the two Bates bulls, Lord Kirklevington, of Erie, 1399193 and Marquis of Kirklevington 99395.

My ambition is to breed low down, blocky animals as well as great milk producers. My herd won forty-four prizes last year at Iowa State, Minnesota State, Wisconsin State and Dane County fairs. Included in this number are nine sweepstake prizes; four of them being for herds bred and owned by exhibitor. I have won sweepstakes on bulls and grand sweepstakes on herds at State Fair for last three years. All females exhibited by me last year were of my own breeding. I have always at my farm a large number of young bulls to select from, as well as cows in calf, for sale at all times at reasonable prices. We make a specialty of always keeping a number of young animals in show yard condition, so anyone desiring show animals can always find them here. Parties wishing to purchase either single animals or in car load lots will always find a large assortment to choose from, and at prices where you will always receive good value for your money. Send for catalogue. Address

W. H. JACOBS,

Madison, Wis.

Or, call on P. WAKEM, Manager at Farm, Burke Station, five miles east of Madison on the C., M. & St. Paul R. R.

Ample time given responsible parties.

Mention " Farmers' Institute Bulletin" when writing to Advertisers.

OUR MOTTO

First-Class Plants

At Reasonable Prices.

ALL THE LEADING VARIETIES OF

STRAWBERRIES,

Red and Black Raspberries,

BLACKBERRIES, CURRANTS,

GOOSEBERRIES AND GRAPES.

ALSO

Fruit ✣ and ✣ Ornamental ✣ Trees.

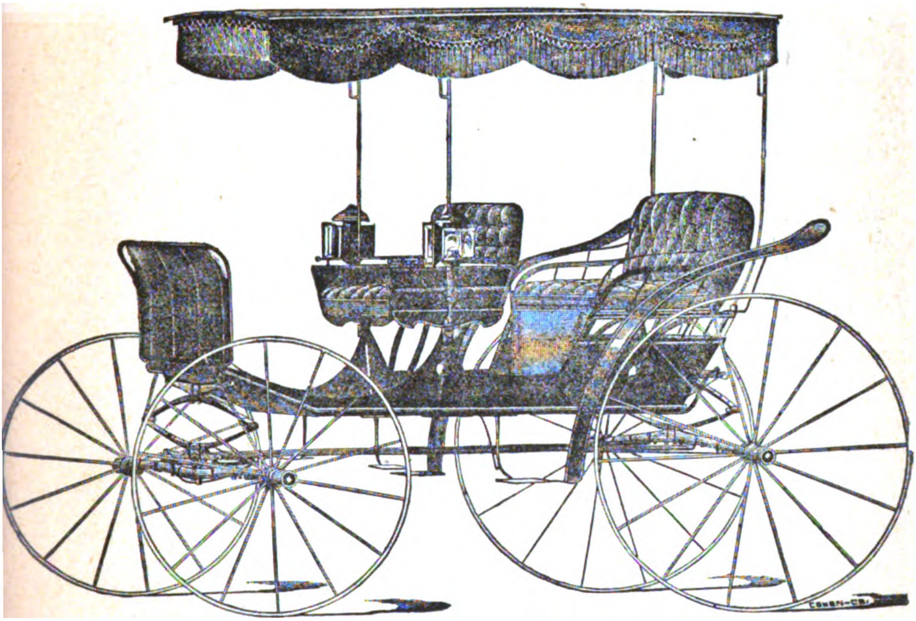
DESCRIPTIVE CATALOGUE FREE.

Special inducements offered to men to take orders in their own vicinity. Write for terms.

J. M. Edwards & Son,
Ft. Atkinson, Wis.

CARRIAGES and BUGGIES

For Less Money Than Ever Before.



Largest Factory IN THE State.

Great Variety, Elegant Styles.
Prices Very Low as to Quality.

Send a Sample Order. Prices and Catalogue on Application.

McFARLAN CARRIAGE CO.,
Connersville, Ind.

Average Weekly Circulation

OVER 190,000!

THE AMERICAN RURAL HOME

ROCHESTER, N. Y.

8 PAGES. 48 COLUMNS.

THE BEST WEEKLY FARM AND FAMILY PAPER IN THE WORLD.

ESTABLISHED 1871.

Leading practical specialists in Stock, Horticultural, Bee, Poultry and Puzzle Departments.

Its General Agricultural and Family Departments are among its best features.

Reports from Crop Correspondents from all sections. Latest Market Reports each week.

$1.00 a year (52 issues). Sample copy free.

RURAL HOME CO., LIMITED,
Rochester, N. Y.

The Best of the

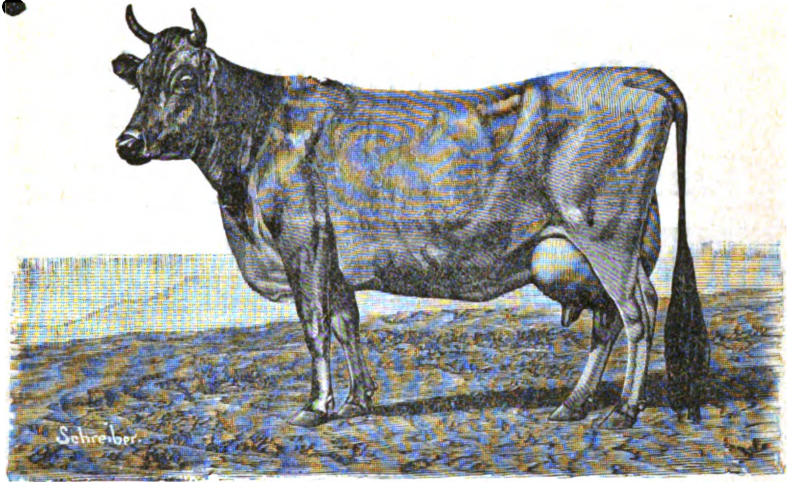
Best Class of

Advertising

Mediums.

“THE MAPLES”

Herd of Jersey Cattle.



IDA OF ST. LAMBERT, 24990. **Property of Miller & Sibley, Franklin, Pa.**
Mr. Fuller says she is the greatest milk and butter giving Jersey combined in the world. Her blood is strongly represented in “The Maples” herd.

The Profit is in the Dairy.

THE BEEF BUSINESS IS DISCOURAGING.

The “General Purpose” Cow is a Delusion

“The Maples” farm, the home of “The Maples Herd of Jersey Cattle,” is situated at the eastern city limits of Madison, Wisconsin. It is easily accessible from the city, as any street car going east will take you within a few moments’ walk. We would be glad to have you come out, whether you wish to purchase or not; you will feel repaid if you enjoy looking at fine Jersey cattle. The choicest strains of Jersey blood are represented in this herd, and the cattle have individual merit.

We trust your visit will be something pleasant to remember; it may result in your thinking of our herd should you ever want anything in Jerseys.

Very truly yours,

Madison, Wis., 1890. **C. B. MILLER & CO.**

1856. THE 1890.

S. L. SHELDON CO.,

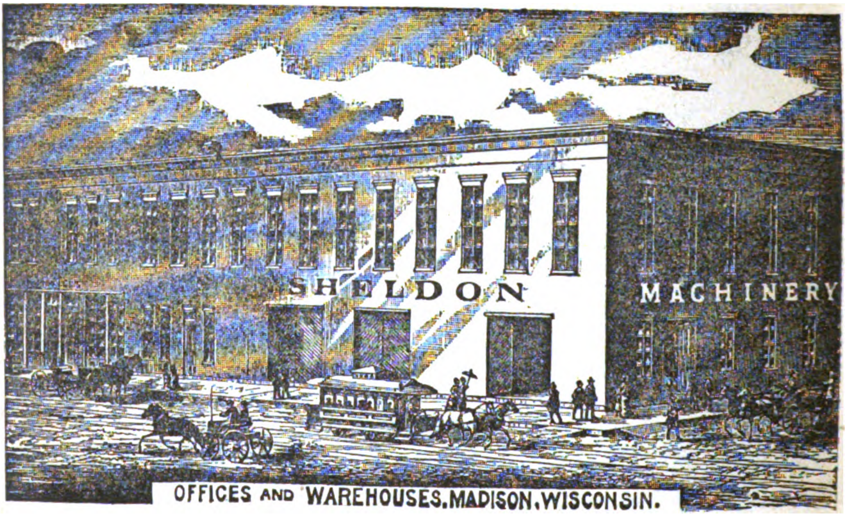
MADISON, WIS.

THE LARGEST GENERAL STOCK OF

Standard Farm Machinery

IN THE NORTHWEST.

A SPECIALTY OF EVERY DEPARTMENT.



OFFICES AND WAREHOUSES, MADISON, WISCONSIN.

Lawn Mowers. Garden Seed Drills and Hand Cultivators. Plows and Soil preparing Tools of every kind. Drills, Seeders and Planters. Double and Single Row Drills for Ensilage Corn Planting. Cultivators for Field, Garden and Tobacco Culture. Latest Improved and Best Harvesting Machinery. Large variety of Feed Mills, Hay Fodder and Ensilage Cutters, also Tread and Lever Horse Powers or Engines to operate them.

WE MAKE A SPECIALTY OF FEED PREPARING MACHINERY.

Write for catalogue and copy of "Facts for Farmers,"

BUGGIES, CARRIAGES, FARM & SPRING WAGONS,

Farm Trucks, Carts, Road Machines and Road Scrapers.

WELL DRILLING AND STUMP PULLING MACHINERY, DITCHING MACHINES AND TILE MAKING MACHINERY.

Come and see us, write for Catalogue, Circulars and prices for anything in our line.

——ADDRESS——

THE S. L. SHELDON CO., Madison, Wis.

COE & CONVERSE,

NURSERYMEN

—— AND ——

Fruit Growers

FORT ATKINSON, WIS.

Small Fruit Plants, Grape Vines, Fruit Trees, Ornamental Trees and Shrubs, Flowering Vines and Bulbs, Seeds and Seed Potatoes.

FRESH FRUITS IN THEIR SEASON.

EVERY family that occupies a piece of land, whether a two rod garden or a thousand acre farm should grow fruit. We mention a few of the leading varieties that are easily grown, hardy, productive and every way good and reliable:

STRAWBERRIES—Jessie, Bubach, Warfield, Haveland, Wilson, Crescent and Park Beauty.

BLACK RASPBERRIES—Tyler, Souhegan, Ohio, Nemha and Gregg.

RED RASPBERRIES—Turner, Brandywine and Cuthbert. Shaffer's Colossol:—A Red Raspberry that does not sucker but grows like a Black Cap.

Improved Dwarf Juneberry.

BLACKBERRIES—Stone's Hardy, Snyder and Ancient Britton.

GOOSEBERRIES—Houghton, Downing and Industry.

CURRANTS--Red, White and Black.

GRAPES—Moore's Early, Worden, Brighton, Niagara and Concord.

We also have Fruit and Ornamental Trees, Roses, Flowering Shrubs and Vines, Bulbs, Etc.

Progressive Farmers find it pays to change their Seed Potatoes frequently. We are making a specialty of growing choice varieties for seed.

Send for one of our Catalogues which tells all about the varieties of Plants, Trees, Shrubs, Etc., that we have to sell and gives prices on them. We will be glad to send it to you free, and should like to correspond with you if you find anything in it you want. We want a good local agent in every county. Write us for terms, etc.

COE & CONVERSE,

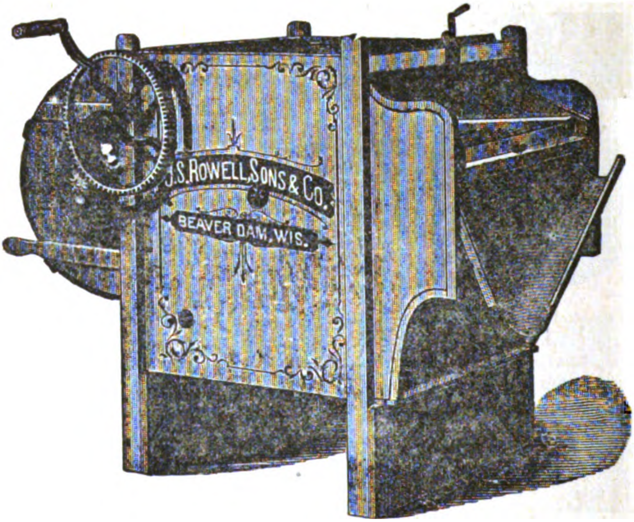
FORT ATKINSON, WIS.

THE FARMER'S FAVORITE,

The Improved Angle Sieve Fanning Mill

The ONE and ONLY True Principle for Separating Oats from Wheat or Barley.

The most successful Separating Device ever invented.


J. S. ROWELL, SONS & CO.
BEAVER DAM, WIS.

Satisfaction guaranteed always. Send for Circulars and Prices.

By recent Improvements made in constructing the **Angle Sieves** and changing the motion of the Shoe, the separating capacity has been increased

ONE HALF.

We can now offer Farmers a Mill that is **Unsurpassed** or **Unequaled** as a Separator and Cleaner of every description of Grain and Seeds.

THIS IS NO HUMBUG! ONE THOROUGH TRIAL ALWAYS CONVINCES!

Special Inducements offered Dealers and Farmers.
Agents Wanted Everywhere.

Address all orders and inquiries to

The J. S. Rowell Mfg. Co.,
Sole Manufacturers of the Improved Angle Sieve Mill,
BEAVER DAM, WIS.

Also manufacturers of the largest variety of Seeding and Cultivating Machines of any concern in the Northwest. The "Tiger" Broadcast Seeders, Hoe Drills, Shoe Drills, Spring Tooth Field and Corn Cultivators Combined. Hay Rakes and the "Tiger" Separators and Powers.
Send for Illustrated Pamphlets.

Fleming Manufacturing Company,

Fort Wayne, Indiana.

LEADER ROAD MACHINE

Mention this Paper.

AGENTS WANTED.
Farmers Preferred.

Address,
FLEMING MFG. CO.
Fort Wayne, Ind.

Send for Catalogue.

——MANUFACTURERS OF——

Improved Road-Making Machines,

The "Leader" (Four-Wheel) Road Grader,

The "Walk-Away" (Four-Wheel) Road Grader,

The "Boss" (Two-Wheel) Road Grader,

The Wood Frame Reversible, *The Steel Frame Reversible.*

—— ALSO DEALERS IN ——

ROAD PLOWS, DRAG SCRAPERS AND EXCAVATORS.

MACHINES SENT ON TRIAL.

Saint Paul & Duluth R. R.

1,000,000 ACRES

OF TIMBER, AGRICULTURAL AND GRAZING

LANDS

Situated in the most fertile and productive portion of the state of Minnesota. These lands abound in NATURAL MEADOWS, interspersed with numreous Lakes and Streams, and are unequaled for raising stock and all agricultural products. These Lands are located between the cities of St. Paul and Duluth, and afford the purchaser a choice of markets, at a low rate of freight to

ST. PAUL, MINNEAPOLIS & DULUTH

THE THREE BEST MARKETS in the west for grain, stock and all farm products.

These lands are for sale on easy terms and low prices—Maps and circulars showing location of lands and terms of sale will be sent free upon application to

HOPEWELL CLARKE,
LAND COMMISSIONER,
SAINT PAUL & DULUTH R. R. CO., SAINT PAUL, MINNESOTA.

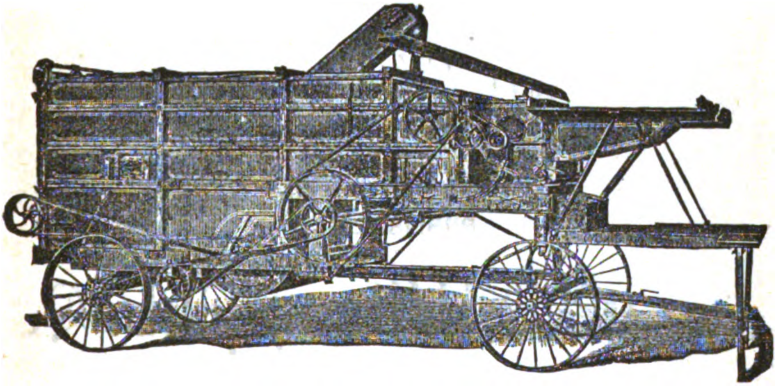
☞ *Mention "Farmers' Institute Bulletin" when writing to Advertisers.*

J. I. Case Threshing Machine Co.

RACINE, WISCONSIN.

MANUFACTURERS OF

IRONSIDES ✣ AGITATOR



SEPARATOR,

Automatic Swinging Straw Stackers,

Woodbury (Dinger) Horse Powers, Tread Powers and Saw Frames, Single and Double Portable

SAW ✣ MILLS,

TRACTION, PORTABLE AND SKID

ENGINES

FROM 6 TO 30 HORSE POWER.

CATALOGUE MAILED FREE.

The Farm, Field AND Stockman

THE MOST POPULAR

FARM AND FAMILY JOURNAL.

PUBLISHED BY

Howard & Wilson Pub. Co.,

CHICAGO, ILL.

PRICE ONE DOLLAR PER YEAR,

With 20 Parcels of Choice Seeds Free to Each Subscriber.

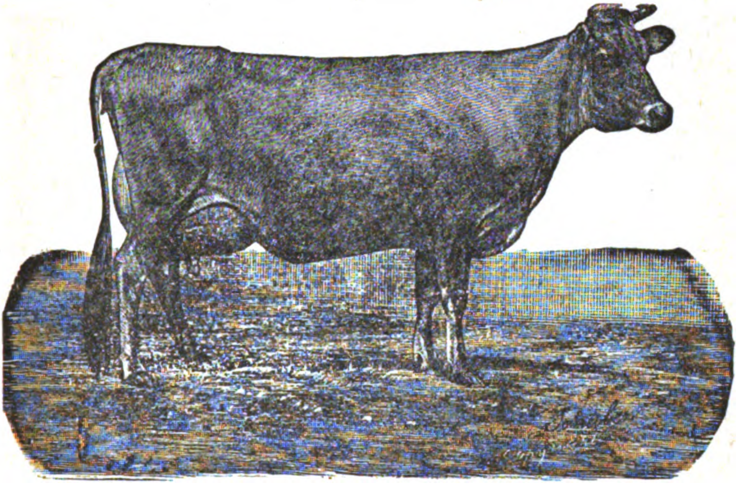
Splendid Inducements to Club Raisers.

200 SPECIAL PREMIUMS FOR 200 LARGEST CLUBS

Send Stamp for Sample Copy and Large Illustrated Premium List.

SILVER SPRINGS HERD

JERSEY CATTLE.



MARY ANNE OF ST. LAMBERT.

The foundation of this herd was selected with great care, only animals of great dairy merit were admited. No color foolishness was allowed to prejudice us in making selections. The five cows purchased were good for an annual average of 500 pounds of butter each. The herd is headed by the two

PRIZE AND SWEEPSTAKES BULLS,

JUMBO OF RIVERSIDE,

SIRED BY PEDRO, A SON OF EUROTAS,
AND OUT OF A GRAND-DAUGHTER OF JERSEY BELLE OF SCITUATE: AND

FAITH'S PRINCE POGIS,

Sired by the only son of the famous **MARY ANNE** of St. Lambert, and out of

FAITH OF OAKLANDS,

——SWEEPSTAKES COW OVER ALL CANADA.——

The aggregate weekly butter record of the dam and sire's dam of **FAITH'S PRINCE POGIS** is over 54 pounds.

These two bulls individually have no superiors and but few if any equals. They are large, symmetrical, vigorous, muscular and strong in constitution. Their breeding combines the blood of the great cows:

JERSEY BELLE OF SCITUATE, 705 pounds of butter in a year; EUROTAS, 778 pounds of butter in a year; MARY ANNE OF ST. LAMBERT, 876 pounds of butter in a year, and EUROTISAMA, 945 pounds, 9 ounces of butter in a year; FAITH OF OAKLANDS, 17 pounds, 4 ounces of butter in a week, 9,265 pounds of milk in 365 days.

Stock is the very best; not overfed or "doctored," and always gives satisfaction.

T. L. HACKER, Madison, Wis.

Circulation 36,000. **Price Only 50 Cents a Year.**

Farm, Stock and Home,

Minneapolis, Minnesota.

One of the Foremost Agricultural Papers in the Country!

Practical, Reliable, Entertaining.

On Its Editorial Staff are the following: John Gould, of Ohio, the celebrated Dairy and Silo specialist; C. L. Gabrilson, of Iowa, an "all purpose" farmer of distinction; Theo. Louis, of Wisconsin, the eminent swine, corn and clover grower; J. S, Harris, of Minnesota, the widely known and able Horticulturist; U. G. Cox, who, he thinks, must have been "born in a hen coop," and L. H. Wilcox, the Apiarist, represent their respective interests.

Contributed to by practical and intelligent farmers, their wives, sons and daughters, from all parts of the country.

Public Questions of vital interest to farmers are discussed with absolute freedom from partisan bias. Questions of all kinds answered. An ably conducted Veterinary department.

The Home Council is of sbecial interest and value to the home, the wives and daughters.

Farm, Stock and Home is a 16-page, handsomely priuted journal, published the 1st and 15th of every month, and is now about entering its seventh year.

Valuable Premiums for Clubs!

Cash Commissions to Agents!

Extraordinary Inducements to Canvassers!

Sample Copies Furnished Free on Application.

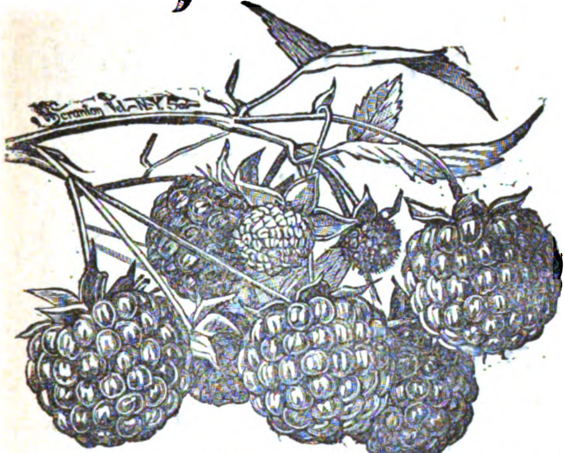
Address,

FARM, STOCK & HOME,
Minneapolis, Minn.

Read the next number of Farm, Stock and Home.

Mention "Farmers' Institute Bulletin" when writing to Advertisers

500,000 PLANTS.



Big Berries!

AND

Lots of Them
CAN BE GROWN

By procuring plants at

RIPON AND SPARTA FRUIT FARMS,

C. H. HAMILTON, Prop., Ripon, Wis., M. A. THAYER, Sparta, Wis.,

Who cultivate and have for sale plants of the following varieties:

Britton and Snyder Blackberries
Lucretia Dew Berry.
Gregg, Ohio, Souhegan, Tyler,
Nemaha, Carman, Johnston's
Sweet, Earhart, Everbearing,
Black Raspberries.
Marlboro, Hansell, Cuthbert,
Golden Queen, Rancocas, Red
Rasberries,
Downing, Industry, Triumph,
Houghton, Goosberries
Fay's Prolific, Victoria, Cherry,
White Grape, La Versellare,
Red Dutch, and Lee's Prolific,
Black Curants, 1 and 2 yrs. old
Grapes-All the Leading varieties.

Large Stock of First-Class Plants, and at reasonable prices. Correspond with me, if you wish to plant, and get prices. Yours truly,

C. H. HAMILTON, RIPON, WIS.,

SEE SPARTA AND RIPON FRUIT FARMS, PAGE 321.

ON ITS MERITS

The National Stockman and Farmer

PITTSBURGH, PA.,

Has built up the Largest Circulation of any paper of its Class in the World.

BY ITS MERITS

It holds it. It is without doubt the brightest and best **farmers** paper published to-day.

With its 24 PAGES and 24 DEPARTMENTS every week it is also the cheapest paper in the country. It is devoted entirely to the farmers' interests, has no axes to grind or hobbies to ride, is clean, fresh, reliable, and right up to the times in everything. The market reports are alone worth many times the subscription price to the enterprising farmer' The best agricultural, live stock and dairy writers contribute to its columns every week. All the live stock and agricultural news of the country is found in its pages.

In short, it is THE paper for the FARMER, and if you want to keep posted "right up to the handle" in your own line of work and chosen occupation you want to take THE STOCKMAN.

"All this being true, what more do you want?"

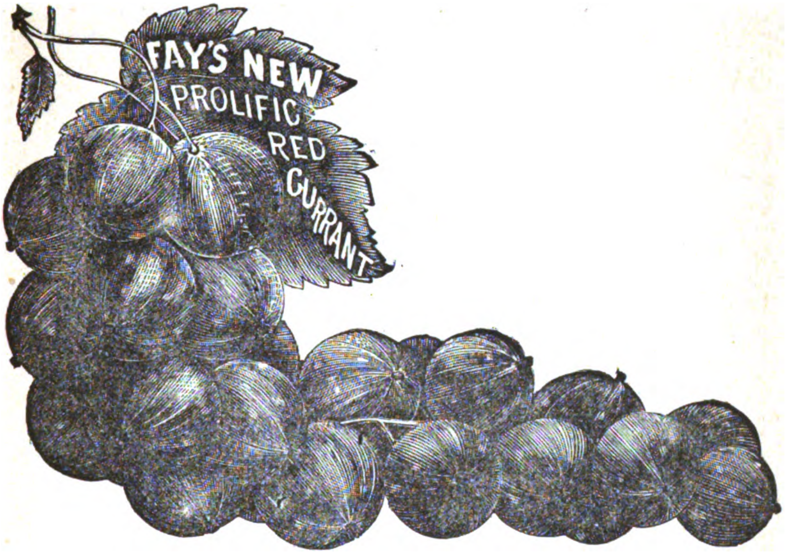
SINGLE SUBSCRIPTION, $1.50 PER YEAR

In Clubs of Five, $1.00. Samples Free.

TRY IT A YEAR AND SEE WHAT IT IS.

Mention "Farmers' Institute Bulletin" when writing to Advertisers.

A. CLARK TUTTLE.



BARABOO, WIS.

Headquarters for

ADAPTED NURSERY STOCK.

WRITE FOR DESCRIPTIVE CIRCULARS AND PRICE LISTS.

If you can induce your neighbors to pool their orders with yours, send them in, and save you all considerable expense.

WRITE ◆ FOR ◆ DISCOUNTS.

Potted Strawberry Plants if ordered Early.

GOOD MEN FIND IT AN OBJECT TO CANVASS FOR MY GOODS.

FARMERS' REVIEW

Chicago, Ill.

The leading Agricultural Journal of America.

The acknowledged authority on Crop and Stock statistics.

Original Articles on all Farm Topics by the best informed and most Practical Writers.

Full and Authentic Reports of Shows and Conventions.

The best Advertising Medium, as it has the largest paid circulation of any Weekly Agricultural Paper in the United States.

The only Weekly Agricultural Paper published in America that furnishes proof of circulation claimed.

Subscription Price $1.25 per Annum.

Specimen Copy free on Application.

HANNIBAL H. CHANDLER & CO., Prop.
Chicago, Illinois.

GENESEE SALT COMPANY.

MERCANTILE
EXCHANGE,
NEW YORK.

NATURAL CRYSTAL
PURE SALT

PRODUCE
EXCHANGE,
CHICAGO.

WORKS AT PIFFARD, N. Y.
Manufacturers of the Justly Celebrated

Genesee Factory Filled Dairy Salt,

IN SPECIAL GRAINS FOR

BUTTER, CHEESE AND TABLE USE.

The only Dairy Salt that does not lump, harden or gather moisture.

THE BEST, because it is
THE PUREST,
THE DRYEST,
THE WHITEST,
THE STRONGEST,
And Most Uniform Salt in the World.

FREE FROM PAN SCALES.

For season of 1888 and 1889, butter and cheese salted with Genesee Factory Filled Salt were awarded First Premiums at the

WISCONSIN, IOWA, MINNESOTA AND NEBRASKA STATE FAIRS.

Eight First and Four Second Premiums at the
AMERICAN FAT STOCK AND DAIRY SHOW.
First Premium at the Iowa State Dairymen's Association. Second Premium at the Wisconsin. Grand Sweepstakes at the Illinois. First Premium at the Michigan.
An Unprecedented Record by any salt in the history of Dairying.

This salt is made from a natural flow of clear, fully saturated Brine; is in its natural crystal, and is not ground. It is now used by the

Largest Creameries and Cheese Factories in the Country.

Samples, Price Lists and Testimonials Furnished on Application.

LOOK HERE!

DO YOU WANT AGRICULTURAL PAPERS

——IF SO,——

The Stockman & Cultivator

WILL GET THERE FOR YOU.

READ OUR OFFER.

We will give you THE STOCKMAN and CULTIVATOR, published at Omaha, Neb., semi-monthly, 16 pages, 50 cts. per year.

THE FARM JOURNAL, published at Philadelphia, Pa., monthly, 24 pages, 50c. per year.

THE WESTERN SWINEHERD, published at Geneseo, Ill., monthly, 20 pages, 50 cts. per year.

THE LADIES' HOME COMPANION, published at Springfield, Ohio, semi-monthly, 16 pages, 50 cts. per year.

In all four papers, the choicest in their classes, publishing 72 copies per year. containing 1,296 pages of the best Agricultural and domestic reading, all for $1.00, These papers have no equals in quality, and we are confident that no such clubbing offer has ever been made, and no such offer can be made by any other combination of papers.

SEND $1.00 FOR THE BIG 4

——TO THE——

STOCKMAN AND CULTIVATOR,

OMAHA, NEB.

N. B.—If you want to get up a club for the STOCKMAN AND CULTIVATOR, we will make you rates which can't be beat.

Vacuum Pan Dairy Salt

In Purity,
Strength,
Evenness of
Grain and
Antiseptic
Properties,
Surpasses
All Others

It is the
Purest,
Cleanest,
Strongest,
Cheapest
and
BEST DAIRY SALT
In the World.

At Wisconsin State Fair 1889, Butter Salted with VACUUM PAN SALT was awarded 12 premiums out of 16.

At Walworth County Fair 3 premiums out of 4.

At Waukesha County Fair but one premium on Butter was given, it went to Butter Salted with VACUUM PAN SALT.

At Columbus State Dairy Association Meeting, 1890, four packages of Butter Salted with VACUUM PAN SALT was awarded 3 premiums.

At Belvidere, Ill., 1890, at the State Dairy Association Meeting, but one package of Butter Salted with Vacuum Pan Salt was on exhibition, it was awarded First Premium in dairy class.

REFERENCES.

A. R. Hoard, Fort Atkinson, Wis.; Marr & Kachel Bros., Whitewater, Wis.; C. B. McCanna, Burlington; Harris & West, Spring Prairie, Wis.; J. G. Flack, Elkhorn, Wis.; Hon. Hiram Smith, Sheboygan, Falls; H. K. Loomis, Asst. Dairy Commissioner, Madison, Wis.; H. D. Morse & Son, Winona, Minn.; H. F. Pierce, Monticello, Iowa; A. J. Dunham, Almoral, Iowa; Geo. Whyte, Paton, Iowa; J. A. Decker, Fulton, Mo.

Butters & Peters Salt and Lumber Co.,

LUDINGTON, MICH.

For Prices Apply to

R. M. BOYD, Agent, Racine, Wis.

Mention "Farmers' Institute Bulletin" when writing to Advertisers.

A PAPER FOR THE MILLION.

THE WESTERN RURAL AND AMERICAN STOCKMAN.

Five column 16-page paper of solid reading.

The largest and best of its kind.

PRICE $1.50 PER YEAR.---LESS IN CLUBS,

Please compare THE WESTERN RURAL with any other Agricultural and Live Stock Paper in the United States.

Instructive, Entertaining and Useful to all Members of the Family both Young and Old.

THE RURAL inaugurated the Farmers' Alliance Movement ten years ago, and it is now the most powerful combination of producers in the Nation. This organization has done much to agitate reforms which are already beginning to crystallize into needed legislation. The low price of farm products and the disadvantages under which the producers are struggling render it the more important that farmers should stand together for their rights.

THE WESTERN RURAL for twelve years has stood in the front of the battle against the enemies and aggressors which threaten the interests of the productive classes. This Journal is entitled to the support of all true patriots and those having at heart the best interests of the Nation.

THE RURAL means business and with the hearty support of the great farming interest can do a vast amount of good. We want an active representative in every neighborhood in the Union, to whom we offer special terms for clubs.

THE RURAL is making a substantial gain in circulation and with the plan we are now inaugurating we intend by your help, reader, to double our already large subscription list. We must reach the people at any cost. For particulars address,

MILTON GEORGE, Publisher, 158 Clark St., CHICAGO, ILL.

RULES OF ORDER AND RALLYING SONG BOOK.

Our Rules of Order and Rallying Song Book for the farmers' organizations. The accepted standard. Thousands sold. It contains a history of the Farmers' alliance, Parliamentary Rules for conducting meetings, and a large number of popular songs with music. Price 60 cents, ten or more copies 35 cents each, post-paid.

POCKET DICTIONARY.

Pocket Dictionary and a little work on Rural Architecture. The two books sent post-paid for 80 cents. The work on Architecture contains a plan of a fine barn on Rural Glen Farm donated by the publisher of THE WESTERN RURAL to the School of Agriculture and Manual Training for Boys. The street waifs of the city of Chicago are educated and trained to good citizenship on the 300 acre farm. Also a large number of plans for houses and out-buildings.

THE WESTERN RURAL YEAR BOOK.

The Western Rural Year Book and Encyclopedia of Reference, price $1.75. We will send the book express paid by us for $1.20. This book contains a history of all the improved breeds of domestic animals, Veterinary Department, and treats on 500 other important and interesting subjects not found in any other book. No farmer can afford to be without it.

FARMERS' ACCOUNT BOOK.

Containing fifty spaces for days' doings and weather record and elaborately arranged for keeping all sorts of accounts. Price, $1.00. Price to the members of Co-operative Union, 75 cents, post-paid.

CAREER OF THE STOLEN BOY CHARLEY.

The Career of the Stolen Boy Charley, in cloth and gold, a $1.25 book sent post-paid for 60 cents. For above orders, address MILTON GEORGE, Pub., 158 Clark St., Chicago, Ill.

THE FARMERS' SUPPLY CO. AND CO-OPERATIVE UNION.

158 CLARK STEET., CHICAGO, ILL.

For Alliances and other organizations to buy from first hands at the least expense. Having special arrangements with wholesale houses handling different classes of goods, we can furnish at wholesale, Dry Goods, Clothing, Boots, and Shoes, Watches, Harness, Buggies, Guns, Hardware, Paints, Drugs or nearly everything a farmer needs.

We call attention to our High Arm Sewing Machine, $19.50; Scott's Charcoal powders highly medicated, for all kinds of stock. Also Binding Twine at lowest figures. When Groceries are ordered in quantities contained in Original packages a great saving may be made by farmers.

We help the farmers to buy and sell.

Write for price of what you want. Binding Twine at Anti-Trust prices.

We supply the farmers with any kind of merchandise, or handle their grain in car lots with prompt returns.

Send your orders for goods or consignments of grain to our address.

THE FARMERS' SUPPLY CO.,

MILTON GEORGE. Treas., 158 Clark Street, Chicago, Ill.

SEE RIPON AND SPARTA FRUIT FARMS, PAGE 313.

SPARTA & RIPON

FRIUT FARMS

M. A. THAYER,
C. H. HAMILTON.

HEADQUARTERS FOR

Choice Fruits, and Small Fruit Plants of Best Hardy Varieties.

55 ACRES

In Strawberries, Raspberries, Blackberries, Gooseberries, Currants, Etc.

500,000 PLANTS FOR SALE.

THE LARGEST STOCK OF

PLANTS

IN THE NORTHWEST, OF THE FOLLOWING HARDY VARIETIES.

STRAWBERRIES.
500,000 PLANTS.
Crescent, Wilson, Buback, Sharpeless, Captain Jack, **Gandy, Haviland, Cloud,** Jessie, Warfield.

RASPBERRIES.
200,000 PLANTS.
Gregg, Nemeha, Ohio Souhegan, Johnson Sweet, Carman, **Shaffer's, Colossal,** Golden Queen, Hansel, Marlboro, Cuthbert.

BLACKBERRIES.
200,000 PLANTS.
Ancient Briton, Snyder, Stone's Hardy, and Lucretia Dewberry.

CURRANTS.
100,000 PLANTS.
Fay's Prolific, Victoria, White Grape, White Dutch, Long Bunch **Holland,** Prince Albert, Red Dutch.

GOOSEBERRIES.
10,000 PLANTS. Downing, Houghton, Triumph, Smith's, Industry.

GRAPES.—All the Leading Varieties.

We sell plants of above varieties, and cultivate only such as are hardy, and do well in a northern climate. Immense stock of plants. Make your orders early, and buy *Home-grown Plants.* Correspondence solicited.

M. A. THAYER, SPARTA, WIS.

5,000 FARMERS

Throughout the United States and Canada have bought and used the past season

Breed's Universal Weeder and Cultivator.

For weeding and cultivating corn, potatoes, beans, peas, and all standard farm crops. For harrowing in all kinds of grain and grass seed, leveling and cultivating growing grain it has no equal. Read what well-known farmers say of the weeder:

SUMMIT CO., O., June 10th, 1890.

UNIVERSAL WEEDER CO., No. Weare, N. H.

Dear Sirs:—I have used your weeder now two seasons. One would think such a light harrow would do little good such a season as this, but it has been very valuable to me. After our potatoes were planted it rained heavily and quite constantly for nearly a month. This packed the ground very hard, so hard the weeder could hardly touch it. As soon as we could see the rows we cultivated the field and followed with the weeder, which hoed the strips along the rows left by the cultivator, nicely stirring every bit of soil. There was one outside row, too rough to use the weeder on (plowed nearer the fence than usual), which my man hoed by hand. While he was hoeing that row my son hoed with the weeder and one horse, more thoroughly, 36 rows. We had harrowed the piece between showers so there were no weeds. We had a shower last night and my son is running the weeder over more than an acre an hour to-day, doing the hoeing and cultivating both, as deep as we want it done now. I am sorry we have not another weeder so we could get over all the ground while it is just right to crumble nicely. Must have two next year. I have not used the weeder on corn except on sweet corn in the garden. It worked all right there. T. B. TERRY.

BUTLER CO., OHIO, June 12th, 1890.

MANUFACTURERS OF BREED'S UNIVERSAL WEEDER:

Dear Sirs:—The spring has been most unfavorable for the use of your weeder, as there have been ten or fifteen days at a time that it rained continually, and by the time we could work the land it would be packed and weedy. I have for these reasons been unable to use it on only one field, but it has there given entire satisfaction, keeping the land clean and mellow, and is just what I have been wanting for years—an implement that would enable me to break the crust just at the right time after a rain, and thus stop the growth of weeds and check evaporation by furnishing an earth mulch. We find that with rows of fair length we can work two acres an hour with it. I think it would be especially adapted to a dry season, as the land could be worked level and kept mellow so as to largely control evaporation. We are using the weeder to-day on a field of potatoes a foot high, and it does the best work it has done yet for we have hit just the right condition of soil.

WALDO F. BROWN.

UNIVERSAL WEEDER CO., No. Weare, N. H.

Dear Sirs:—Your favor of the 9th received. We did not use the weeder immediately after the planting, as the season was very late and we were obliged to put on both harrows and continue harrowing until the corn was up. The working capacity of the weeder being only 6 ft. 6, would not cover as much ground as the harrow. We think the weeder should be made considerably longer in order to do the same amount of work that the harrow will. After harrowing the ground thoroughly rains came and delayed the work for a week, corn was now 8 inches high, too high for the harrow, and the ground had become very compact and the weeds had got quite a start. My men looked with a sort of contempt on the weeder, and I let them go to work with their cultivators while I personally took the weeder, my object being to see how clean I could make hill culture in a separate field. The corn being about 8 inches in height, and also about one acre of potatoes which had been cultivated between the rows, but were very weedy in the hills. Indeed I was astonished at the result. The loose soil between the rows enabled the weeder to take hold in the hills and rooted out the weeds and exposed them to the sun with little harm to the corn or potatoes. If used rightly and intelligently in a field that has received proper cultivation, with favorable weather, it has no equal in weeding all hoed crops. I do not think anything can beat it in potato culture. I went into my garden where potatoes were 12 inches high and it did the tops no harm while it eradicates all the weeds. I have no hesitation in recommending it for general use. My only objection is that it does not cover as much ground as I should like. With a good walking horse, a man with judgment, understanding the art of cultivation, will get over 10 acres a day and do good work.

THEODORE LOUIS, LOUISVILLE, WIS.

(The weeder can be made any desired length.—U. W. Co.)

THE UNIVERSAL WEEDER CO., No. Weare, N. H.

Gents:—The Breed's Universal Weeder I bought from you this spring is one of the best tools I ever used in the early cultivation of corn. Early and often is the motto of the weeder. I have had it twice over 35 acres already, and shall make it follow the cultivator crosswise once more.

Respectfully, A. J. EMERTON, PORTAGE, WIS.

C. R. Medlaugh, Woodbourne, N. Y., writes that the weeder is as near perfection as possible.

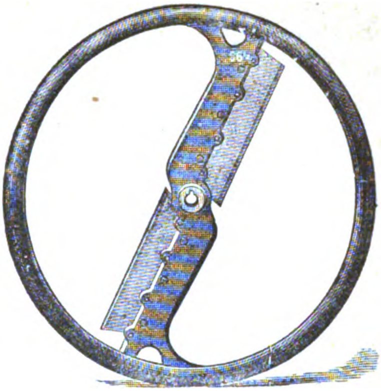
Let every farmer desiring clean, perfect culture and wishing to lessen expense in the cultivation of his crops, inquire into this matter. Circulars explaining the work of the weeder and giving testimonials from farmers from all parts of the United States sent to any address free of expense, from general agents or from the home office.

GENERAL AGENTS—Lindsay Bros., 121 & 123 Clybourne St., Milwaukee, Wis.
Lindsay Bros., 104 & 106 3rd Ave., N., Minneapolis, Minn.

Manufactured and sold by

The Universal Weeder Co., No. Weare, Hillsboro Co., N. H.

CONCAVE KNIFE.



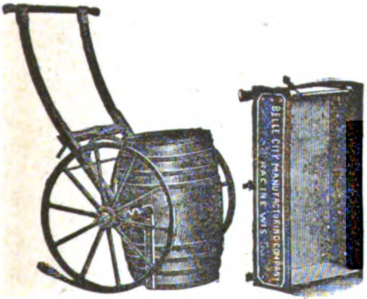
STRAIGHT KNIFE.

We have three different styles of Knives, two shown on this page, and one (convex) shown on all prints of Machines.

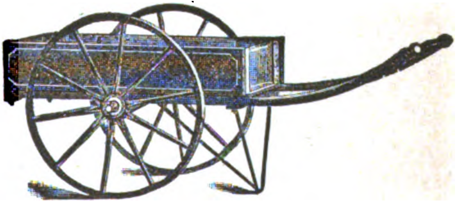
Belle City Manufactur'g Co.,

RACINE, WISCONSIN.

Send for Illustrated Catalogue and Price List.


BELLE CITY MANUFACTURING COMPANY RACINE WIS.

COMBINED CART,
For box or barrel.

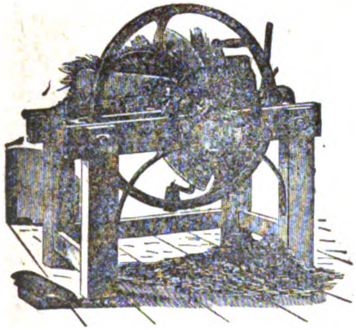


CITY TRUCK CART.

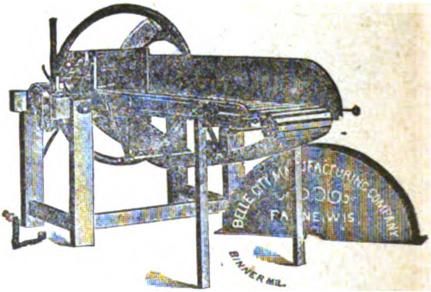
The Belle City Manuf'g Co.,

RACINE, WISCONSIN,

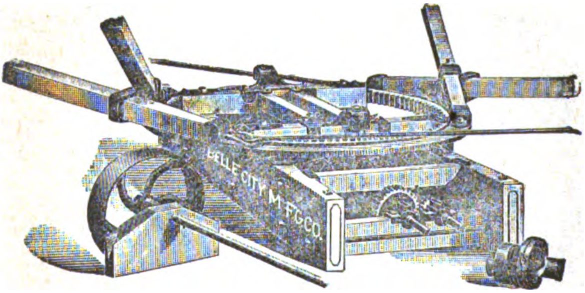
Will gladly send their illustrated catalogue and price list of Fodder and Ensilage Cutters, Horse Powers, Root Cutters, Feed Grinders, Water Carts, Truck Carts, Harrows and Cultivators, and other implements, to any who may write for it.



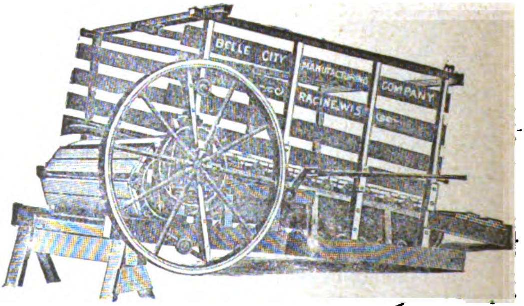
POWER CUTTER,
With Chain Feed Attachment.



FRONT VIEW OF POWER MACHINE.


BELLE CITY M'F'G CO.

**TWO AND FOUR HORSE POWER,
With two sweeps.**



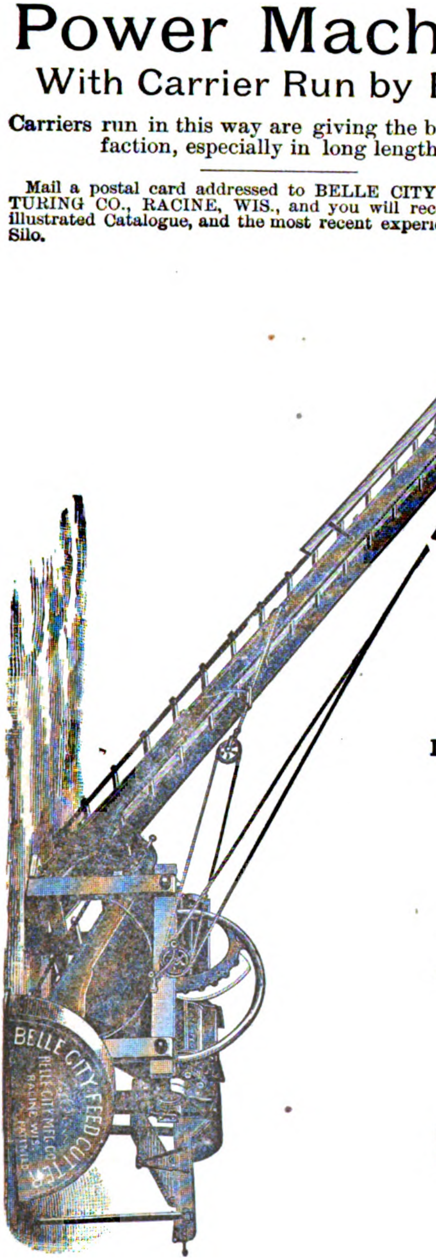
TWO HORSE TREAD POWER,
With Patent Governor and Brake.

See Opposite Page.

Power Machine
With Carrier Run by Rope.

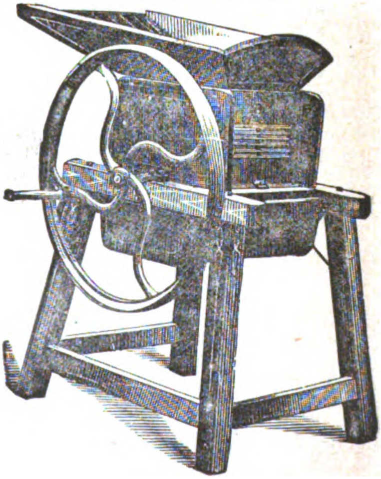
Carriers run in this way are giving the best of satisfaction, especially in long lengths.

Mail a postal card addressed to BELLE CITY MANUFACTURING CO., RACINE, WIS., and you will receive a finely illustrated Catalogue, and the most recent experience with the Silo.



BELLE CITY
DOUBLE ACTION
ROOT CUTTER
For Power or Hand Use.

Different styles and smaller sizes furnished, if desired.



PROFIT IN THE DAIRY.

West Lawn Herd,

OF

Thoroughbred Registered Jerseys,

A. J. C. C.

The time has passed when Jerseys were considered only good as expensive playthings for wealthy farmers. They are going rapidly into the hands of practical men, because they are not only great cream and butter producers, but because they produce cream and butter fat in greater proportion to the food consumed than common stock. This is the vital point in the whole question of stock selection. The farmer who wants to make money believes in the Jersey because when he puts a dollar into her in the shape of feed he can get more than a dollar out if he handles the product properly. The cheap cow is the one that pays the interest on her cost, and a large profit on her feed and care. The expensive cow is the one which does neither. The most expensive cow can frequently be bought for twenty dollars. A cheaper animal can often be bought for one hundred dollars. A common cow costs $25 and will produce 150 pounds of butter per year worth $30 at creamery prices. A good Jersey cow can be bought for $125 that will consume no more and will produce 300 pounds of butter worth $60. The difference in first cost is $100, upon which the interest charge is $7 per year. The difference in value of butter products is $30 per year, in favor of the high-priced cow; deducting the interest on the difference in price we have a difference of $23. This leaves the calves out of the question. The average calf of the Jersey is worth $30. The average calf of the common cow is worth $3. The revenue from the common cow will just about buy feed enough to keep her. The Jersey yields enough to keep her and two more just like her. Can the poor man afford to keep a poor cow?

My stock has been selected largely for dairy purposes, and has been managed upon the idea that the most valuable dairy stock is obtained from cows that are brought near their limit of butter production. They have never been pampered or overfed, or subjected to any other treatment than is given upon all good dairy farms. A test of fourteen mature cows taken on the morning of July 9, 1890, at the State Experiment Station, indicated an average of 4½ per cent of butter fat. This in the hottest month in the year, when the average is unusually low. The butter yield indicated by this test was 140 pounds per week for the fourteen cows, or 10 pounds per cow per week. A single handful of shorts was fed twice each day.

The bull at the head of the herd is a pure St. Lambert, solid dark fawn, very prominent eyes, deep bodied, and with every indication of the great constitutional vigor of his family. Alphea blood is largely represented in the herd, and some strong line of Omaha, Lady Mary and St. Lambert.

West Lawn Farm adjoins the city of Madison on the southwest. It is one mile from the Mil. & St. Paul R. R. depot. Visitors will be met at trains any time, upon notice, and taken to the farm. Send for catalogue and descriptive circular to

H. C. ADAMS, Madison, Wis.

SIR HUGO OF ST. LAMBERT (18726), who stands at the head of my herd, was dropped Jan. 12, 1881. Bred by R. H. Stephens, St. Lambert, Canada. He is of solid color; black tongue and switch. A very rich Victor Hugo-St. Lambert bull. See his pedigree and notes on opposite page.

SIR HUGO OF ST. LAMBERT, 13726.

Orloff, 3143......... ...
Sire of
Carrie Pogis, 15 lbs. 9 ozs.
Matchless of St. Lambert, 24 qts with third calf.
Grand sire of
Niobe of St. Lambert, 21 lbs. 9½ ozs.
Nell of St. Lambert, 48 lbs. milk, first calf, two years old.
Ida's Stoke Pogis, who sold for $5,000. His daughter gave 45 lbs. of milk per day and sold for $1,650.

Lucy of St. Lambert, 5116.....................
Dam of
Cora of St. Lambert, 20 lbs. 8 ozs.
Nancy of St. Lambert, 14 lbs. 5 ozs. with second calf 3 yrs old.
Pet of St. Lambert, who is dam of Diana of St. Lambert, 16 lbs. 8 ozs., who is dam of Nymph of St. Lambert, 13 lbs. 4 ozs., with second calf 2 yrs. 8 mos. old.
Grand dam of
Cowslip of St. Lambert, 17 lbs. 12 ozs.
Ida of St. Lambert, 30 lbs. 2½ ozs.
Allie of St. Lambert, who gave 53 lbs. milk per day and tested at 26 lbs. 12 ozs per week.

Lord Lisgar, 1066. .... ..
Great grandsire of Rubano, 8806, sire of
Duchess of St. Lambert, 15 lbs. 13 ozs. in 7 days.
Clematis of St. Lambert, 14 lbs. 3 ozs.
Jolie of St. Lambert, 15 lbs 13½ ozs.
Sweet Briar of St. Lambert, 22 lbs. 12 ozs.
Lord Lisgar, 1066, sired the dams of
Ida of St. Lambert, 30 lbs. 2½ ozs.
Cowslip of St. Lambert, 17 lbs. 12 ozs.
Minette of St. Lambert, 17 lbs. 4 ozs.
Brenda of Elmhurst, 17 lbs. 4¾ ozs.
Diana of St. Lambert, 16 lbs. 6 ozs.
Nora of St. Lambert, 14 lbs. 7 ozs.
Moss Rose of St. Lambert, 14 lbs. ½ oz.
Juliette of St. Lambert, 18 lbs.
Honeysuckle of St. Anne's, with 2d calf, 14 lbs. 10 ozs.
Jessie Brown of Maxwell, rate of 14 lbs. 7 ozs.
Honeymoon of St. Lambert, 20 lbs. 5¼ ozs.
Lord Lisgar's son, Lord Aylmer, sired Melia Ann, 18 lbs. ½ oz.
Lord Lisgar is g. g. sire of Mary Anne of St. Lambert, 36 lbs. 12¼ ozs. in 7 days; Naiad of St. Lambert, 23 lbs. 2 ozs in 7 days; Judith Colman. at 2 years and 11 mos. old, 17 lbs. 5 ozs.; Aldeph Julea, 15 lbs. 1¾ ozs.

Ophelia, 493.............. .
Dam of Maggie of St. Lambert, 16 lbs. 3 ozs.; 3 years old sold for $3,000.

Victor Hugo, 197,
Gave from 12½ to 50 per cent to 55 butter cows, with tests from 14 lbs. 2 ozs. to 36 lbs. 12¼ ozs. Among them he gave 25 per cent to Ida of St. Lambert, 30 lbs. 2½ ozs.; 25 per cent to Sweet Briar of St. Lambert, 22 lbs. 12 ozs.; and 18¾ per cent to Mary Anne of St. Lambert.

Lydia. 495 ....
Grand dam of Clematis of St. Lambert, 14 lbs. 3 ozs., who is dam of Honeysuckle of St. Anne's, 21 lbs. 12 ozs.

Victor Hugo 197
Victor Hugo has contributed of his blood to the following animals, with records of over 14 lbs, in addition to those shown under the heading of Lord Lisgar of this pedigree:
Mermaid of St. Lambert, [illegible]5 lbs. 13½ ozs.
Niobe of St. Lambert, 21 lbs. 9½ ozs.
Rioter Pink of Berlin, 19 lbs. 10 oz.
Melia Anne, 18 lbs. 12 ozs.
Crocus of St. Lambert, 17 lbs. 12 ozs.
Dido Miss, at rate of 17 lbs. 1 oz.
Cill of Glen Rough, 16 lbs. 6 oz.
Moth of St Lambert, 16 lbs. 2 oz.
Coquette of Glen Rough, 15 lbs. 1¼ ozs.
Nordheim Creamer, 14 lbs. 7 ozs.
Nancy of St. Lambert, 14 lbs. 5 ozs.
Pearl of St. Lambert, 14 lbs, 2 ozs.

Pauline, 494,
Maternal grand dam of
Melia Anne, 18 lbs. 10½ ozs.
Grand dam of
Duchess of St. Lambert, 15 lbs. 13 ozs.
Clematis of St. Lambert, 14 lbs. 3 ozs.
Jolie of St. Lambert, 15 lbs, 13½ ozs.
Sweet Briar of St. Lambert, 14 lbs. 3 ozs.
Great grand dam of
Niobe of St. Lambert, 21 lbs. 9½ ozs.

On L. of J.

Lisette, 492.
12½ per cent. of her blood to
Sweet Briar of St. Lambert 22 lbs. 8 ozs.
Lolie of St. Lambert, 15 lbs. 13 ozs.
Pearl of St. Lambert, 14 lbs. 2 ozs.

On I of J.

Bonnie, 491.
Dam of Bonnie 2d, 14 lbs. 11½ ozs.; Grand dam of Unita, 4748, 14 lbs. 10 ozs.

STANDARD RURAL BOOKS

THE DAIRYMAN'S MANUAL.

A PRACTICAL TREATISE ON THE DAIRY.

Including the Selection of the Farm, the Cultivation of Crops, the Selection and Breeding of Cows, Management of the Milk, Making Butter and Cheese, and the Treatment of Diseases Incident to Dairy Cows.

BY HENRY STEWART,

AUTHOR OF "THE SHEPHERD'S MANUAL," "IRRIGATION FOR THE FARM, GARDEN, AND ORCHARD," ETC.

TABLE OF CONTENTS.

Chapter I.—Dairy Farming.
Chapter II.—Dairy Farms.
Chapter III.—Cows for the Dairy.
Chapter IV.—Breeding and Rearing Dairy Cows.
Chapter V.—Crops for Dairy Farms.
Chapter VI.—Grasses for Pastures and Meadows.
Chapter VII.—Soiling and Soiling Crops.
Chapter VIII.—Ensilage of Fodder.
Chapter IX.—Dairy Buildings.
Chapter X.—Water Supply.
Chapter XI.—Foods for Use in the Dairy.
Chapter XII.—Feeding Rations.
Chapter XIII.—Management of Cows in the Stable
Chapter XIV.—Rearing Calves for the Dairy.
Chapter XV.—Milk.
Chapter XVI.—Cream.
Chapter XVII.—Milking and Milking Apparatus.
Chapter XVIII.—The Care of Milk.
Chapter XIX.—Cream and its Peculiarities.
Chapter XX.—Churning and Churns.
Chapter XXI.—Butter.
Chapter XXII.—Creameries.
Chapter XXIII.—Ice-Houses.
Chapter XXIV.—Cheese Making.
Chapter XXV.—Milk Dairying.
Chapter XXVI.—Winter Dairying.
Chapter XXVII.—The Family Dairy.
Chapter XXVIII.—Diseases of Cows.

Illustrated. Cloth, 12mo. Price, Postpaid, $2.00.

HOW CROPS GROW.

NEW EDITION, RE-WRITTEN AND ENLARGED.

A treatise of the Chemical Composition, Structure, and Life of the Plant. This book is a guide to the knowledge of agricultural plants, their composition, their structure, and modes of development and growth; of the complex organization of plants, and the uses of the parts; the germination of seeds, and the food of plants obtained both from the air and soil. This great work has stood for nearly a quarter of a century as the standard authority in its field. For the past two years Prof. Johnson has been engaged in revising it. The work has been practically rewritten throughout, and brought down to date, as containing the substance of all knowledge on the topics presented. The book is an invaluable one to all real students of agriculture. With numerous illustrations and tables of analysis. By Prof. SAMUEL W. JOHNSON, of Yale College.

Cloth, 12mo. Price, Postpaid, $2.00.

Johnson's How Crops Feed.

A companion volume to "How Crops Grow." Illustrated. By Prof. SAMUEL W. JOHNSON. Cloth, 12mo. Price, postpaid, $2.00.

IN PRESS—**Cider Makers' Hand Book.—A complete guide for making and preserving cider.** Illustrated. Cloth, 12mo, $1.00.

Orange Judd Company,

52 & 54 Lafayette Place, New York.

STANDARD RURAL BOOKS

New American Farm Book.—Originally by R. L. Allen. New revised and enlarged edition by L. F. Allen. The first edition of this work was regarded as the best upon the subjects of which it treated, and the later edition, revised and enlarged, maintains its place in the front rank. Cloth, $2.50.

Allen's American Cattle.—Their history, breeding and management New and revised edition. By Lewis F. Allen. Illustrated. Cloth, 12mo, $2.50.

Gardening for Profit.—By Peter Henderson. No farmer or gardener can afford to be without one or both of these books in his library. Ever since their publication, down to the latest and revised editions, they have been regarded as the best books upon the subjects treated. Cloth, 12mo, $2.

Gardening for Pleasure.—Cloth, $2.

Practical Floriculture.—Cloth, $1.50.

Silos, Ensilage and Silage.—A practical treatise on the Ensilage of Fodder Corn. By Manly Miles, M. D., etc. Illustrated. Cloth, 12mo, 50c.

Harris's Talks on Manures.—By Joseph Harris. The latest edition of this work contains a chapter especially written for it by Sir John Bennet Lawes, of Rothamsted farm, and has also been revised and enlarged by Mr. Harris. Cloth, $1.75.

Harris on the Pig.—Cloth, 12mo, $1.50.

Fuller's Small Fruit Culturist.—By A. S. Fuller, author of "Practical Forestry," "Grape Culturist," etc. New edition. The standard authority upon small fruits. Fully illustrated. Cloth, $1.50.

Fuller's Grape Culturist. Cloth, 12mo, $1.50.

Profits in Poultry.—Useful and ornamental breeds and their profitable management. This excellent work contains the combined experience of a number of practical men in all departments of poultry-raising. It is profusely illustrated, and forms a unique and important addition to our poultry literature. Cloth, 12mo, $1.

The Shepherd's Manual.—By Henry Stewart. A practical treatise on the sheep for American shepherds. New and enlarged edition. Illustrated. Cloth, $1.50.

Keeping One Cow.—A number of practical writers have given in this useful little book their experience in the management of a single milch cow, and the suggestions made will be valuable to those who keep one or more cows. Cloth, $1.

Coburn's Swine Husbandry.—By Hon. F. D. Coburn. This most valuable work on the management of swine, and prevention and treatment of their diseases, has been thoroughly revised and enlarged by the author in this new edition. Cloth, $1.75.

Quinby's Bee-Keeping.—By L. C. Root. The mysteries of bee-keeping explained, combining the results of fifty years' experience with the latest discoveries and inventions, presented in the most improved methods, forming a complete guide to successful bee-keeping. With one hundred illustrations, and a portrait of M. Quinby. New and revised edition. Cloth, 12mo, $1.50.

Cottage Houses.—By S. B. Reed, author of "House Plans for Everybody." For village and country homes, with complete plans and specifications. New edition. Cloth, $1.25.

House Plans for Everybody.—By S. B. Reed. Designs of dwellings are given, costing from $250 to $8,000, with estimates of all articles used in buildings. Cloth, $1.50.

Barns, Plans and Out-Buildings.—This work is the cheapest for the price ever issued upon the subject of which it treats. It abounds in hints and suggestions, and contains 275 illustrations. Cloth, $1.50.

Barry's Fruit Garden.—By P. Barry.—New edition, thoroughly revised by the author. From its first issue, this book has held a place in the front rank as a standard authority upon the subject of which it treats, and the author's long practical experience, which is here related, makes this work of the highest value. Cloth, $2.

American Grape-Growing and Wine-Making.—By George Husmann, Napa City, Cal. New and revised edition No one stands higher as an authority upon grape-growing and wine-making than Prof. Husmann, and we have here a record of his own experience, and also that of others of high reputation. Illustrated. Cloth, $1.50.

The Dogs of Great Britain, America and Other Countrys.—New and enlarged edition. The breeding, training and management of dogs in health and disease, comprising the essential parts of the two latest standard works by Stonehenge. It gives the prize winners at dog shows, down to the last, and describes the best hunting-grounds in America. Over 100 engravings. Cloth, $2.

Fences, Gates and Bridges.—A much-needed and valuable work. The descriptions are abundantly illustrated. The book also contains a synopsis of the fence laws of the different states. Over 200 engravings. Cloth, 12mo, $1.

Our Homes; How to Beautify Them.—Beautifully illustrated with 150 engravings. One of the most interesting and useful books for every family Cloth, 12mo, $1.

Practical Taxidermy and Home Decoration.—By Joseph H. Batty. With instructions for collecting and mounting animals, birds, fish, insects, etc.; 125 illustrations. Cloth, $1.50.

Armatage's Every Man His Own Horse Doctor.—Together with *Blaine's Veterinary Art*, and numerous recipes. A valuable and comprehensive guide for both the professional and general reader, with the fullest and latest information regarding all diseases, local injuries, lameness, operations, poisons, the dispensatory, etc., with practical anatomical and surgical illustrations. By Prof. George Armatage, M. R. C. V. S. New edition. One large octavo volume, 830 pages, half morocco, $7.50.

Armatage's Every Man His Own Cattle Doctor.—Half morocco, $7.50.

Herbert's Hints to Horse-keepers.—This is one of the best and most practical works on the Horse prepared in this country. Illustrated. Cloth, 12mo, $1.75.

The Family Horse.—Its Stabling, Care and Feeding. By Geo. A. Martin. A practical manual, full of the most useful information. Illustrated. Cloth, 12mo, $1.

Diseases of Live Stock.—And their most efficient remedies, including Horses, Cattle, Sheep, Swine, Dogs, etc. By Wm. B. E. Miller and Lloyd V. Tellor. Fully illustrated. Cloth, 8vo, $2.50; Sheep, $3.00.

Our New Illustrated Catalogue of over 300 Books mailed post-free to any address.

ORANGE JUDD CO., New York.

Mention "Farmers' Institute Bulletin" when writing to Advertisers

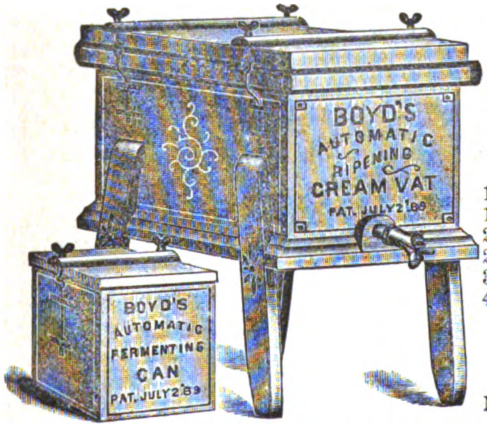
BUTTER-MAKING

Reduced to a Simple Science

—BY—

BOYD'S PROCESS OF RIPENING

CREAM OR MILK.



PRICE LIST.

10	Gal. Vat,	$18.00	FERMENTING CANS. 1 Gal		$4.50
15	"	21.00			
20	"	24.00			
30	"	27.00			
50	"	30 00			
75	"	36.00	2 Gal.		5.00
100	"	42.00			
150	"	48.00	3	"	5.50
200	"	54.00	4	"	6.00
250	"	60.00	5	"	6 50
300	"	66.00	6	"	7.00
400	"	75.00	8	"	7.50

Licensed under John Boyd's Patents,

Nos. 406,081, 429,186, 429,187.

Adapted to the Creamery and Dairy.

In small and moderate-sized dairies, the best results in both quantity and quality of butter is obtained WITHOUT the use of ICE. The CREAMING OF MILK also rendered unnecessary.

HON. WM. H. GILBERT, President of New York Dairy Association, said at a recent dairy conference, in reply to the question, "How do you ripen your cream?" "I use John Boyd's Process. At first I rejected it, but have been converted; not by FAITH, but by WORKS."

JOHN BOYD, Patentee and Man'f'r.

199 LAKE St., Chicago, Ill.

THE FARM JOURNAL,

PHILADELPHIA, PA.,

Now in its fourteenth year, was started and conducted on a plan of its own.

OUR EDITORIAL PLAN.

It is our constant endeavor to treat all subjects in season; to be concise and to the point; to be practical, rather than theoretical, and to exclude long-winded discussions and fine-spun theories of fancy farmers.

The editor was born on a farm and reared at the plow handles, and our contributors are mostly practical men and women, who write with their sleeves rolled up, and who briefly and plainly tell the best and most profitable way of doing things on the Farm and in the House, as learned from actual experience.

It is through strict adherence to this plan, in every department, that we are enabled to present much useful and acceptable information to our readers.

It is boiled down. It is cream, not skimmings. It is clean. You do not have to hide it from the children. Its advertising columns are carefully scanned, and no quack medicine, snide or fraudulent advertisement is inserted.

The subscription rate is 50 cents a year in advance. In clubs considerably less. Write for free specimen copy and blank.

Address,

FARM JOURNAL.

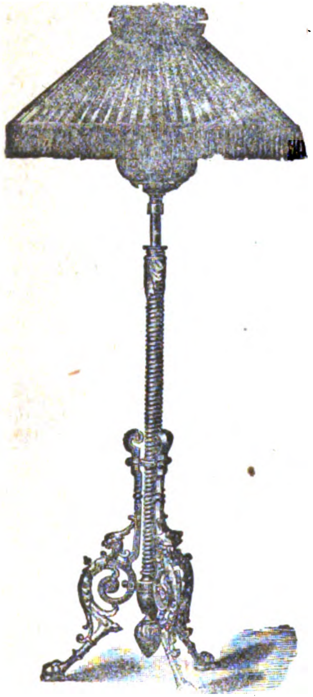
WILMER ATKINSON, Editor and Proprietor.
CHARLES F. JENKINS, Associate Publisher.

W. K. STAFFORD & CO.,

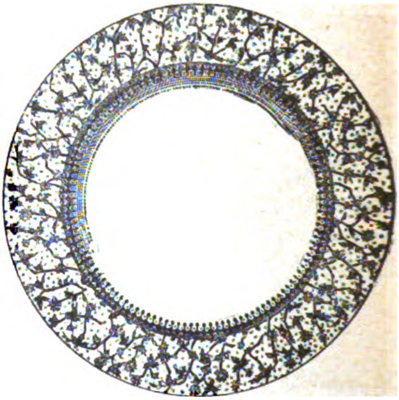
414, 416 Milwaukee St.,
MILWAUKEE, ✦ WISCONSIN,

IMPORTER OF

CHINA, POTTERY, GLASS AND LAMPS.



FINEST STOCK OF Staple and Fancy Crockery IN THE NORTHWEST.



IMPERIAL

DINNER SETS IN OPEN STOCK,

Our Great Specialty.

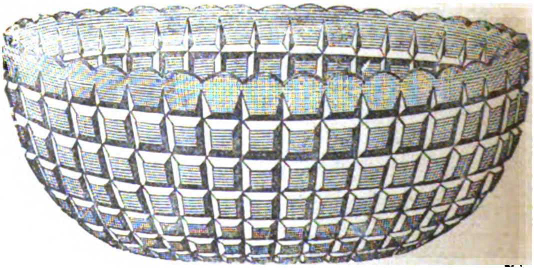
Latest productions in TEA SETS, TOILET SETS, COURSE SETS, GLASSWARE, HANGING AND TABLE LAMPS. ROCHESTER LAMPS in great variety, at lowest prices.

PIANO, or FLOOR LAMPS,
Over 40 beautiful patterns in stock, from $10 upwards.

HOTEL AND RESTAURANT GOODS OF ALL KINDS.

CALL AND SEE US WHEN IN MILWAUKEE.

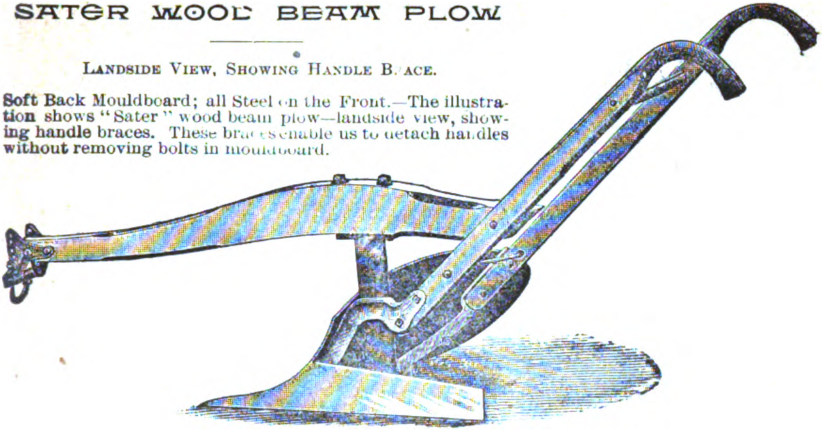
Prices Guaranteed THE LOWEST in the City.



SATER WOOD BEAM PLOW

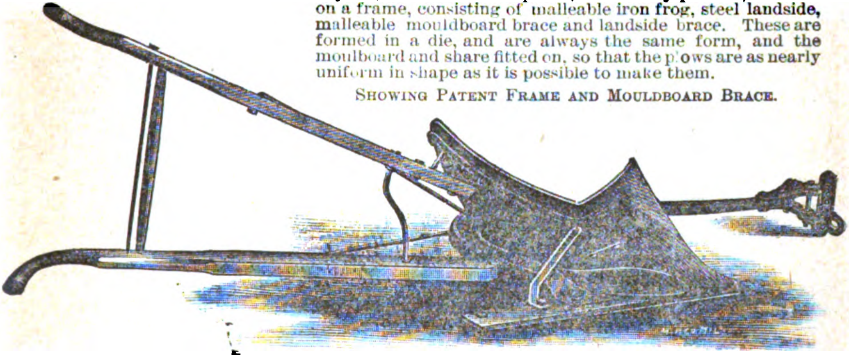
LANDSIDE VIEW, SHOWING HANDLE BRACE.

Soft Back Mouldboard; all Steel on the Front.—The illustration shows "Sater" wood beam plow—landside view, showing handle braces. These braces enable us to detach handles without removing bolts in mouldboard.



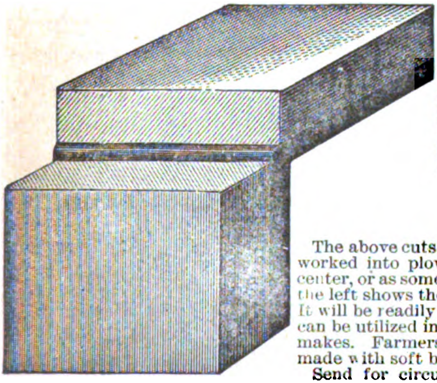
PATENT FRAME.—The Sater plow, as well as wheel plows, covered by patents, is made on a frame, consisting of malleable iron frog, steel landside, malleable mouldboard brace and landside brace. These are formed in a die, and are always the same form, and the mouldboard and share fitted on, so that the plows are as nearly uniform in shape as it is possible to make them.

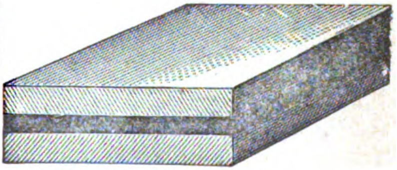
SHOWING PATENT FRAME AND MOULDBOARD BRACE.



The above cut shows the Patent Frog and Mouldboard Bracing used on our "Sater."

THE SHIN.—No other plow manufacturers even pretend to shin the soft back mouldboards on the front. Ours are shinned on both front and back, thus making a genuine triple shin, and will wear much better than any other. All our stubble plows have the soft back mouldboards unless otherwise ordered, and all have the patent heel plate that has become so popular. Every walking 14-inch plow and all larger sizes is furnished with 3-horse clevis, so that either two or three horses can be used.





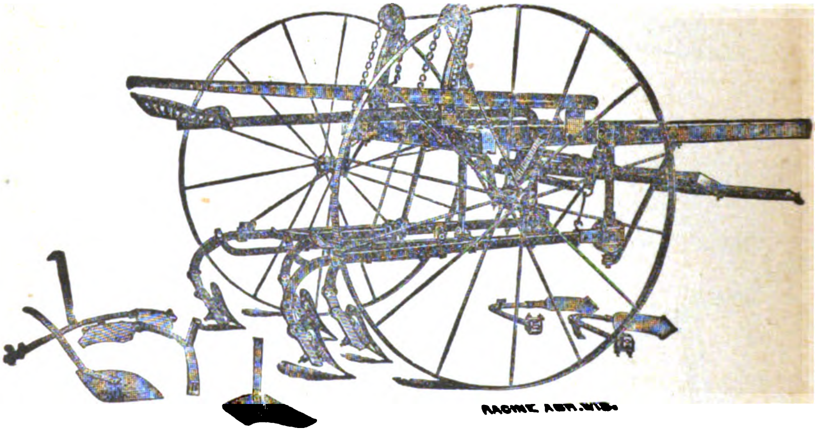
PLOW STEEL.

The above cuts represent the different ways Plow Steel is worked into plows. The cut at the right shows the iron center, or as some plow manufacturers make plows; the one at the left shows the soft steel back, or as we make our plows. It will be readily seen that there is double the material that can be utilized in our plows that there is in those of other makes. Farmers will find it of great benefit to buy plows made with soft back and extra case-hardened mouldboard. Send for circulars of Cultivators, Planters, Mowers and Rakes, Tobacco Transplanters, Disc Harrows, etc., manufactured by

FULLER & JOHNSON MFG. CO., Madison, Wis.

IMPROVED

Bonanza Riding Cultivator.



Steel or Wood Beams, High Arch, Steel Axle, Long Drag Bars.

Can be Used with Four, Six or Eight Shovels.

ADVANTAGES.

The axle is made adjustable for cultivating in wide or narrow rows

Axle is *very high* so that it will not break down the corn. The draft **is direct from axle, and is** so attached that it can be raised up or down and **whiffletrees fixed at any point that may be desired.**

Drag bars are attached to standards so as to swing with the least **possible friction. Beams and** shovels are provided both with friction slip and break pin, to prevent **any possible danger of** breaking shovels. Shovels are extra hardened and will scour equal **to anything that can be had.** Shovels are attached so as to be adjustable in every way; **can be given more curve or set straight;** set to throw dirt to or from corn.

We furnish either foot lifts or springs. **The hand levers are very convenient to the driver, and** drag bars can be raised very easily. **The seat is adjustable high or low, also forward and back, so** as to balance the pole perfectly. **Wheels are high, and are made with iron hubs and run on steel axles. The tires on wheels are bolted to felloes.**

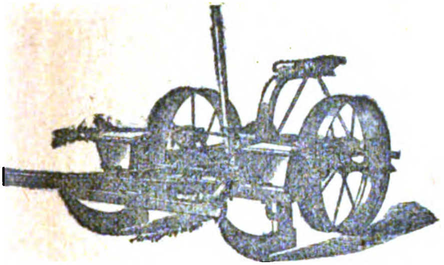
SURFACE CULTIVATING.

These Cultivators are provided with shovels *plated and sharpened on upper end* **so that when** corn is well grown and there is danger of destroying roots by using pointed **end of shovel and** working deep in ground, the shovel may be reversed and the broad **end of same worked in ground,** which will destroy all weeds and grass, but will not go deep **enough to destroy roots of corn. Few** farmers fully **realize the** damage done to corn by deep cultivating **after it is well grown and roots** are much **spread. Deep cultivating** should be done while corn is **small and before roots have spead.**
Manufactured by

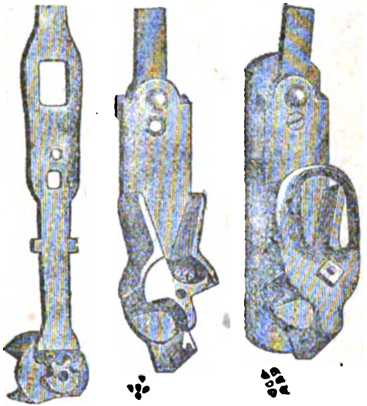
FULLER & JOHNSON MFG. CO.,
MADISON, WIS.

☞ ***Mention "Farmers' Institute Bulletin" when writing to Advertisers.***

BONANZA FORCE DROP
Corn Planter and Check Rower.



The above cut shows our Bonanza Force Drop Corn Planter with our Improved Check Rower.



Above cuts show the working parts of the Force Drop. Cut at left shows the manner in which the lever causes the seed cup to revolve, and throw the corn to place. The center cut shows the seed cup in position with corn in cup, and also hill of corn that has just been dropped. The cut at the right shows the whole seed cup and lever, and also hill of corn just dropped.

SPECIAL POINTS.
FORCE DROP! IRON JOINTS!
METAL WHEELS!
IRON SEED BOXES!
CENTER LOCK LEVER!

Runners can either be locked in the ground or depth regulated by the Driver's feet.
It forcibly *throws* the corn so that it drops to the ground *instantly* when the lever is thrown, so that it makes no difference whether team is driven fast or slow, or by jerks.
Will plant corn in straight rows both ways, whether team goes fast or slow. This alone will save the price of Planter for every 100 acres planted, by not having corn destroyed by cultivating.
When raised out of the ground it is self-locking, thus avoiding the use of latches.
It has glass at the heel of the drop so that the driver can at all times see the corn dropping.

CHECK ✦ ROWER.
SPECIAL POINTS.
Made Entirely of Iron and Steel. No Wood Frame Across Planter. Great Strength.
Easy Movement. Only Three Working Parts in Center of Check Rower.

Made adjustable for either our 3 ft. 6 or 3 ft. 8 Planter.
Driver can throw off the wire at end of field without leaving his seat, by pulling the string attached to latch and hand lever. (See cut.)
This Check Rower is of the very latest improvement, is adapted especially to our Force Drop Planter, and the two together make the very best outfit for planting corn to be found in the market. We defy anyone to produce its equal.

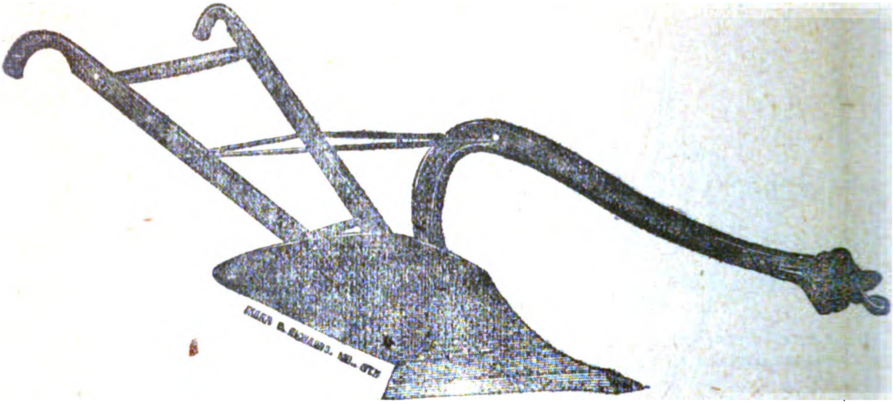
ENSILAGE ATTACHMENT.
A Drill or Ensilage Attachment makes it a perfect machine for planting Ensilage Corn. Two rows are planted at a time. The corn can be dropped one kernel in a place and any distance apart that is required. It was used with the best results the past season.

FULLER & JOHNSON M'F'G CO., MADISON, WIS.

✦SCOTLANDER✦

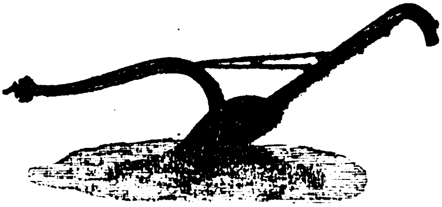
Steel Beam Turf and Stubble Plow.

SIZES 12 TO 16 INCHES.



The **Scotlander** is a general purpose or Turf and Stubble Plow. It is made with long sloping mould board, works well in turning over clover, at same time is a good stubble plow. We believe them to be the very best plow that can be had where a general purpose plow is wanted. It is made with both wood beam and steel beam.

This Plow Is Made With the Patented Reversible Heel.



Patent Reversible Heel for Landside of Plows.

This cut represents our Heel Plate for landside, and the manner of attaching the same to plow.

We put this Heel Plate on all our old ground stubble plows.

The Heel Plate forms a part of landside, and is made fast with one bolt, when the lower side becomes worn the plate can be turned around to bring the thick side down, thereby making it last more than double as long as plows made in the old way.

Farmers should insist upon having their dealers furnish them with plows made with our Patented Reversible Heel on Landside.

IMPROVEMENTS FOR 1889.

We have recently invented and adopted a new and very valuable way for constructing the Mould Board of Plows. In place of using the "soft center" steel or the "soft back" steel as heretofore, and as is used by all other manufacturers of plows. We use a solid Hardened Steel Mould Board and to strengthen it we surround the outer edge of back with a band of soft steel or iron, which gives it great strength and at the same time gives the *full thickness* of the mould board hardened, which makes the wearing qualities of plows made in this way from

One-Third to Two-Thirds Greater

than when made of the "soft center" or "soft back" steel. All farmers will readily see the advantage of this style plow and will not buy plows made the old way when this can be had.

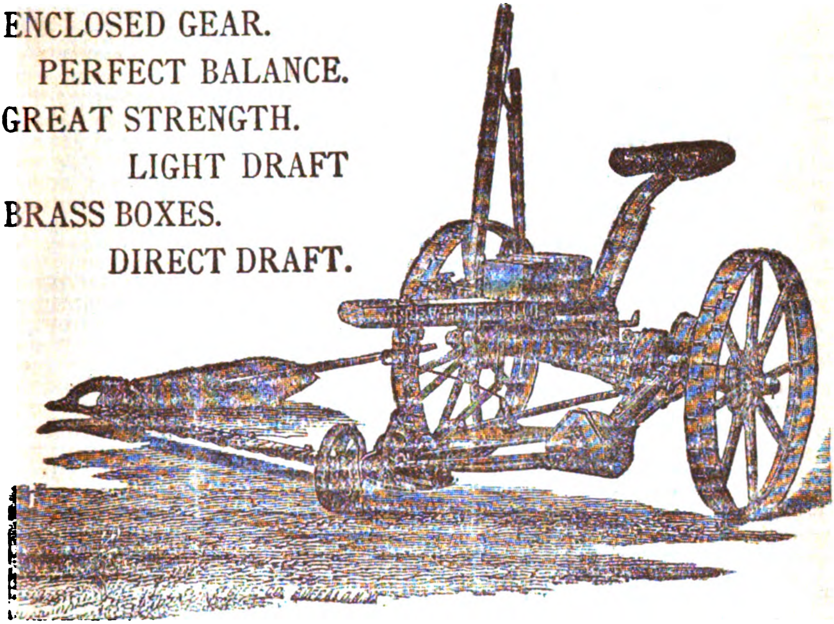
We have patents covering the improvement, and plows made in this way can only be obtained from us or our agents. ☞ **Send for our Catalogue.**

FULLER & JOHNSON M'F'G CO.,

Madison, Wisconsin.

Red, White and Blue Mower.

ENCLOSED GEAR.
PERFECT BALANCE.
GREAT STRENGTH.
LIGHT DRAFT
BRASS BOXES.
DIRECT DRAFT.



Rocking Cutting Bar. Latest Improvements.

BE SURE AND EXAMINE IT CAREFULLY.

Floating and Rocking Bar. No Weight on Horses' Necks. Dust Proof Oil Cups. Steel Plate Under Scythe Head.

No Right or Left Hand Rachets or Wheels, All Fit Either Side.

THE BEST MOWER IN THE WORLD.

Our Red, White and Blue Mower.

To arrive at perfection and secure the greatest possible benefit that can be had from a mowing machine, the *very best* of everything used in its construction must be had, the best of workmanship be performed, and the plan of construction be right in every particular; anything short of these will result in breakages, damaging delays, and the most unsatisfactory work all around.

We spare no expense that is necessary to make our RED, WHITE AND BLUE MOWER the *best*. Long experience, careful study, and expensive experimenting we believe justifies us in saying that we know what is necessary to make a *strictly first-class mowing machine*. This we manufacture, and do not make or offer for sale a low grade or low price, cheap mower.

ADVANTAGES.—The gearing is completely covered or enclosed, so that it is at all times protected from dust and dirt, and will never wear out if bearings are properly oiled. Drive wheels are very high and wide apart, so that the draft is light, and machine will not tip over on side hills. The frame, to which is attached the pole and driver's seat, is hinged under and back of the main axle, and does not get the jar and shaking caused by the gear, so that the driver rides with as much comfort as if in a wagon, and the horses' necks are not made sore by jar from neck yoke and pole. The driver's seat is well back of the main axle and cutter bar, and should he be thrown off in working over rough meadow he would not be in danger of falling in front of cutter bar, he is also in easy reach of the hand lever that raises the cutter bar for passing over stones and stumps, lever for tilting or rocking the cutter bar and lever for throwing machine in or out of gear. Levers for raising and tilting cutter bar are in front of and at the right of driver. There are no right and left hand wheels or rachets, all being made interchangeable. The bearings for crank shaft are made of brass, and if properly oiled and cared for will never wear out. The draft rod is hooked to frame of mower and to whiffletrees under pole, and so placed that all side draft and weight on end of pole is prevented. We use steel and cold rolled shafting to insure *great strength and durability.*

FULLER & JOHNSON M'F'G CO., Madison, Wis.

THE

Western Farmer

A Journal of Progressive Agriculture.

DEVOTED TO THE IMPROVEMENT OF

Horses,

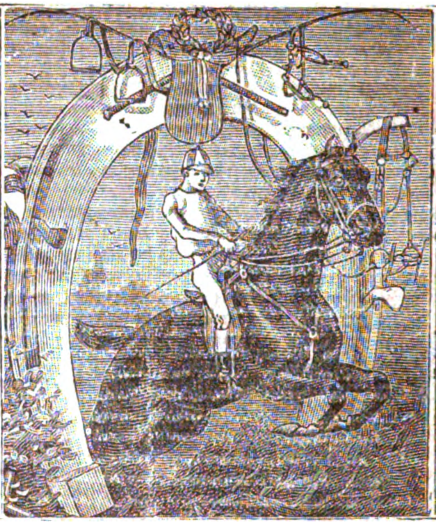
Cattle,

Sheep,

Swine,

Poultry,

Bees,



Dairying,

Fruit-Growing.

Gardening,

Field Crops,

Farm Economy,

Country Homes.

THE WESTERN FARMER

is the official organ of the Wisconsin Farmers' Institutes, and will publish, from week to week, not only full reports of the meetings, but the best papers presented, covering the whole field of advanced agriculture.

THE WESTERN FARMER

will also continue to furnish its readers with the latest practical experiments in agriculture made at the Wisconsin Experiment Station, the best institution of its class in this country.

THE WESTERN FARMER

numbers among its contributors some of the most practical farmers at home and abroad. It is one of the best agricultural journals published. Its Veterinary and Farm Law departments are alone worth the price of subscription each year.

Subscription Price Only $1.00 Per Year,

Postage paid. The best advertising medium in the Northwest. Write for sample copies and terms of advertising. Address

THE WESTERN FARMER CO.,
Madison, Wis.

UNIVERSITY OF MICHIGAN
3 9015 06811 5040

BOUND
SEP 30 1941
UNIV. OF MICH.
LIBRARY